(intrinsically safe) Flow Computer Pipeline Master 110 (i) and 210 (i)



User Manual only valid in combination with the installation instructions of the Batching Master 110 (i) or 210 (i)

Valid from Software version 2.17

Revision 5.00

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Safety information



The Pipeline Master must only be installed by process electronics engineers or qualified electricians who are authorised by the plant operator to carry out these tasks.

The instrument may only be operated by personnel who are authorised and trained by the plant operator.

The Pipeline Master must only be connected as specified in the electrical data. The upper part of the housing must not be opened, otherwise maintenance of the electrical data is not ensured and the guarantee becomes null and void.

Validity of installation and operating instructions

- These manual apply to all Pipeline Master models. It is valid only in conjunction with the installation manual Batching Master.
- Your IBS agent will be able to give you information about any improvements or modifications.
- The manufacturer is not responsible for damage caused by incorrect or unauthorised use. Conversions and changes to the instrument must not be made, otherwise the certification and guarantee become invalid.

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1 Function

The Pipeline Master is a single channel flow computer that evaluates the signal from a flow meter. Various counter blocks are available which can be created on request or at fixed time intervals. With the custody transfer original document memory PCC 400-PM the printouts of the meter blocks can be created and stored.

1.1 Counter blocks A-F

These meter readings are calculated by the Pipeline Master itself. The current flow rate is used for this. The current temperature, density and pressure are used for the volume conversion between mass, volume and standard volume.

The counter blocks A-F can display the following counter states and values:

- Counter: mass, volume and standard volume forward direction
- Error Counter: mass, volume and standard volume forward direction
- Counter: mass, volume and standard volume reverse direction
- Error Counter: mass, volume and standard volume reverse direction
- Average density (only counter B-F)
- Average temperature (only counter B-F)
- Average pressure (only counter B-F)

1.1.1 Number of digits counter block A

The counters of counter block A count to 999.999.999. Then the overflow occurs and the counter starts again at 0. The overflow counter is increased by one. The overflow counters cannot be displayed on the instrument display, but can only be read out via Modbus. On the custody transfer printouts of the PCC 400, the overflow counters are ignored.

1.1.2 Number of digits counter blocks B-F

The counters of the counter blocks B-F count to 999.999.999. Then the counter starts counting again from 0. There is no overflow counter for the counter blocks B-F.

1.2 Counter blocks G-I

These three counter blocks only work with the Promass 84 and Promass 300 mass flow meters from Endress+Hauser. The Pipeline Master reads the Promass values via the second Modbus interface. The second Modbus interface is set as "Modbus master".

The values and units of the meter blocks G-I are read from the counters 1-3 of the Promass flow meter. These values are not converted in the Pipeline Master.

The following informations are displayed:

- G1 bis I1 = Meter reading counter 1–3
- G2 bis I2 = Overflow counter 1–3
- G3 bis I3 = Process variable counter 1–3
- G4 bis I4 = Meter type counter 1-3

1.2.1 Number of digits counter blocks G-I

The counters of the counter readings G1-I1 work up to 9,999,999, then the value starts counting again at 0.

The overflow counters G2-I2 count the number of overflows of the counters G1-I1. E7 for *10 7 and the unit are always displayed after the value.

1.3 Preparation of printouts counter A, G, H, I

These counters cannot be reset. A start value and an end value are always printed. If a printout was created, the Modbus address "Print out ready" is set to 1 and the counter values are made available in a defined register range for the PCC 400. If the PCC 400 has saved the counter readings and created a report, it sets the Modbus register "Print out ready" to 0 again.

If a new printout is created by the Pipeline Master, but the value in the register "Print out ready" was not set to 0, a total printout is created. Start time and start value of the first printout and end time and end value of the second printout are created with the consecutive number of the first printout.

The printout can be triggered by the following signals:

- The Modbus register "Printout request" was set to the value 1.
- By digital input
- By pressing the reset button
- Through the Pipeline Master at fixed intervals, e.g. as a daily report

1.4 Preparation of printouts counter B-F

These counters can be reset and start again at 0 after the printout. If a printout has been created, the Modbus address "Print out ready" is set to 1 and the counter values are made available in a defined register area. If the PCC 400 has saved the counter readings and created a report, it sets the Modbus register "Print out ready" to 0 again.

If a new printout is created, but the value in the "Print out ready" tab has not been set to 0, a total printout is created. This has the start time of the first printout and the end time of the second printout. The quantity is the total of the two printouts and the sequential number is that of the first printout. The printout can be triggered by the following signals:

- The Modbus register "Printout request" was set to the value 1.
- By digital input
- By pressing the reset button
- Through the Pipeline Master at fixed intervals, e.g. as a daily report

1.5 Counter B-F as batch counters

The counters B-F can also be operated as batch counters. Then the counters are set to 0 at batch start and the printout is generated at batch end. In this mode, the quantities between the batches are not recorded in reports and are lost.

Batch control can be carried out via Modbus, a digital input or the keyboard.

1.6 Raw values of the Promass 84F or 300/500

If the connected flow meter is a Promass 84F or 300/500 and its measured values are acquired via Modbus from the second interface of the Pipeline Master, raw values from the Promass are available via the Modbus interface of the Pipeline Master.

2 Operation

2.1 Viewing on the LCD

2.1.1 Viewing in Pipeline Mode

The top line of the display shows the name of the selected counter.

The bottom line shows the meter readings.

Use the keys \checkmark to switch between the counters and the momentary values. Use the $\land \lor$ keys to switch between the individual displays of the selected counter in the counter.

The displayed value is displayed with the corresponding unit. If the RC key is pressed for at least one second, the Pipeline Master sets the Modbus flag to indicate that the terminal mode is desired by the user. A higher-level system can then switch on the terminal mode.

2.1.2 Viewing on the Programming mode

In programming mode, the upper line of the display shows the function currently being executed.

The lower line shows the set value of the function.

If the custody transfer switch is activated, no further settings can be made. The settings cannot be changed until the custody transfer has been cancelled.

2.2 Powering on the Pipeline Master

As soon as the device is connected to the supply voltage, it carries out a self-test. All data stored in the FRAM (Ferroelectric Nonvolatile RAM) are read.

The last meter readings are shown on the display.

2.3 Fault messages

The Pipeline Master can detect various failures. These failure messages are indicated on the display.

If the flow meter is connected via Modbus to the Pipeline Master, the actual error codes from the flow meter are read and the Pipeline Master "ERR Modbus Sensor". By pressing the #-key, the Pipeline Master will show the exact error code of the flow meter as a hexadecimal number. Depending on the connected flow meter you need to convert this hex-number to a decimal or binary number to look up the bug in the manual.

If a failure is active, the counting takes place into the error counters.

2.4 Programming

To enter the programming level, press the Menu key. The Pipeline Master displays the current software version and the instrument number for a short time. Then you find yourself in the programming level.

If a sub-menu is selected, you can acces the next level using the \geq key. A possibly entered code is requested. A possible entered code is queried. In the case of custody transfer instruments, the relevant custody transfer data (installation, calibration and linearisation level) can only be changed by switching the programming release.

Programming is only implemented when the "Quit programming" menu level is correctly terminated. The programming level is quit via a selection menu by pressing the \checkmark key to exit all levels. The "Save" prompt appears. You can change from "No" to "Yes" using the $\land \lor$ keys. The setting is then confirmed by pressing the \prec or Set key. All data are saved.

3 Display menu

In the display menu it is possible to enabled or disable the indication of the counter blocks and physical values on the LCD of the Pipeline Master.

3.1 Activation the indication of the counter blocks

Menu Menu Menu	1.1 to 1.5: 1.13: 1.14 to 1.16:	counter blocks B to F can be switched on or off counter block A can be switched on or off counter blocks G to I can be switched on or off	
3.2	Activation the	indication of the actual process values	
Menu	1.6 to 1.8	Switching mass volume and standard volume flow	N

Menu 1.6 to 1.8	Switching mass, volume and standard volume flow rate
	αlsplay on or oπ
Menu 1.9 to 1.12.	Switching temperature, density, used standard density and
	pressure display on or off

4 Structure menu

4.1 Language of the device

The language for the displayed process and counter values and for programming the device can be selected in menu 2.1.

4.2 Digital inputs - direction of action

In the menu points 2.2.1, 2.2.3, 2.2.5, 2.2.7 and 2.2.9 are used to set the direction of action of a digital input. The setting "normally open" means that a contact must be closed to activate the function. The direction of action is reversed at the setting "normally closed".

4.3 Digital inputs - filter time

In the menu points 2.2.2, 2.2.4, 2.2.6, 2.2.8 and 2.2.10 a filter time for the digital inputs can be programmed. After this time the function of the digital input will activated.

4.4 Digital outputs - functions

A number of functions can be assigned to the five digital outputs in the menu points 2.3.1, 2.3.3, 2.3.5, 2.3.7 and 2.3.9. Note that digital outputs 1 to 3 switch off, when the OFF switch is operated.

4.4.1 Setting a digital output to pulse output

As pulse output, it can output counting pulses or a frequency output related to the current flow rate. With the frequency output, the number of pulses does not correspond exactly to the flow rate. The pulses are output in packets for the counting pulse and evenly for the frequency output. It is also possible to select whether the mass, volume or standard volume flow rate is to be output. The settings are made in submenu 3.4.0.

4.4.2 Setting a digital output to maximum flow alarm

The flow alarm can be triggered at the digital outputs. The alarm value is set in menu 2.6. The flow alarm is not shown on the display and the flow count is not switched to the error counter. Only the digital output switches.

4.4.3 Setting a digital output to failure indication

If the metering is switched to the error counter by a fault, the digital output switches and indicates the fault.

4.5 Digital outputs - direction of action

In the menu sections 2.3.2, 2.3.4, 2.3.6, 2.3.8 and 2.3.10 you set the direction of action of the digital outputs. The "Normally open" setting means that the contact closes as soon as the function is triggered. With the "normally closed" setting, the operating direction is reversed.

4.6 Interface settings

The Pipeline Master includes two serial interfaces. The settings are made in submenu 2.4.0.

4.6.1 **Protocol type of the interface 1**

In menu section 2.4.1 you can select one of the following protocol types:

- Modbus RTU (8 data bits, parity even, 1 stop bit)
- Modbus ASCII (7 data bits, parity even, 1 stop bit)

4.6.2 Address of the interface 1

In menu 2.4.2 you define the device address. You can assign addresses between 1 and 255.

4.6.3 Baud rate of the interface 1

In menu 2.4.3 you specify the transmission speed for the communication. A maximum of 19200 baud can be set for intrinsically safe devices, since the IPC 300i interface module cannot process faster data.

4.6.4 Function of the interface 2

The function of interface 2 can be selected in menu 2.4.4:

- Slave (same function like interface 1)
- Promass 84F (Modbus master, current measured values are polled)
- Promass 300 (Modbus master, current measured values are polled)
- Krohne Optimass (Modbus master, current measured values from MFC 010 are polled)
- Emerson Micromotion (Modbus master, current measured values from MVD are polled)

4.6.5 Setting the protocol type of the interface 2

In menu item 2.4.5 you can select one of the following protocol types:

- Modbus RTU (8 data bits, parity even, 1 stop bit)
- - Modbus ASCII (7 data bits, parity even, 1 stop bit)

4.6.6 Address of the interface 2

In menu 2.4.6 you define the device address. You can assign addresses between 1 and 255.

4.6.7 Baud rate of the interface 2

In menu 2.4.7 you specify the transmission speed for the communication. A maximum of 19200 baud can be set for intrinsically safe devices, since the IPC 300i interface module cannot process faster data.

4.7 Delay time for error messages

In function 2.4.8 a delay time for errors is entered. The error counter is not counted until the error has been present for longer than this time.

4.8 Code entry

All levels can be locked with a code. The code is entered in menu items 2.5.1 to 2.5.7. Before you can open the level, you must enter the specified code. If 0000 is entered as the code, there is no query. If the legal for custody transfer programming switch has been changed, the levels can only be viewed and not changed.

- 2.5.1 Code display menu
- 2.5.2 Code structure menu
- 2.5.3 Code install menu and flow converson menu
- 2.5.4 Code calibration and test level
- 2.5.5 Code characteristic curve/linearisation level
- 2.5.6 Code for SET key
- 2.5.7 Code for RESET key

4.9 Maximum flow alarm

A flow alarm is set in menu item 2.6 (Flow Alarm). This alarm can be output via a digital output, it is not displayed at the Pipeline Master and it does not cause the Pipeline Master to count into the error counter. Via the operating direction of the digital output you can determine whether it is a min or max alarm.

4.10 Sensor break and measuring range overrun

In submenu 2.7.0 you can activate or deactivate the monitoring for sensor break or overrange for current inputs and pulse input.

4.11 **Print errors**

You define in 2.8 whether a printout of the counter readings is to be made in the event of errors. The following settings are available:

- No printout
- In case of error
- In case of error change

This function is not supported by the PCC 400-PM original document memory.

4.12 Output process values at the current output

Function 2.9 is used to set which process value is to be output at the current output. Possible settings are:

No function,
density,
temperature,
pressure,
mass flow,
volume flow and
standard volume flow.

The scaling is taken over from the measuring ranges in function 6.0.

When Flow rate is selected, the final value for 20 mA is set in function 2.9.2.

A filter for the current output can be set in function 2.9.3.

5 Settings in the install level

All important settings that affect the sensor and measuring range are set in the install level (menu 3.0). In certified custody transfer instruments, this level can only be enabled via the programming switch.

5.1 Specifying the sensor inputs

The inputs for the measuring signals for flow, temperature, density and pressure are specified in menu 3.1. You can select between current, pulse and double pulse input. Different mass flow meter can be connected direct with the serial interface. Then the second interface from Pipeline Master is a Modbus Master.

In addition, the measured values can be set via the Modbus interface. This can be used e. g. to check the volume conversion function.

A flow meter with current output must be connect to analogue input 1. A flow meter with pulse output must be connect to pulse input 1. For custody transfer units with 2 pulse outputs use additional the second pulse input. NAMUR pulse outputs connect to pulse input, too. The sensor break could be activated in function 2.7.x.

If the density signal is connected to the second pulse input, 1 Hz correspond to 1 kg/ m^3 (1000 Hz correspond to 1000 kg/m³).

5.2 Measuring range from flow meter

The measuring range is set in function 3.2.x.

5.2.1 Select the measuring unit

The unit for the measuring range is set in function 3.2.1. You can choose between kg, g, mg, l, ml, t, m^3 or "no unit".

5.2.2 Decimal point

The number of decimal places is set in function 3.2.2. All measured values are displayed in this resolution.

5.2.3 End of scale value

The end of scale value is then set in function 3.2.3.

5.2.4 Incoming pulses per unit

For flow sensors with pulse output, the increment per pulse is entered in Function 3.2.4. The numbers of pulses for the last counted digit must be entered.

Example:

You have set a measuring range of 10000 kg/h. This is to be displayed to one decimal place. The sensor supplies 10 pulses/kg. An increment per pulse of 1 pulse / 0.1 kg must therefore be entered.

5.2.5 Allowed error pulses

For sensors with double pulse input, in function 3.2.5 is set the ratio from one error pulse to x pulses. If more error pulses are counted, the flow will be counted in the error counter.

5.2.6 Flow direction

Enter in function 3.2.6 how the flow direction is to be evaluated. You can choose between "always forward", automatic or digital input 1 to 5. If you use double pulse or Modbus input the flow direction could be automatically identified.

5.2.7 Meter Factor

The multiplier for the flow rate correction is indicated in menu item 3.2.7. The default setting is 1.0000 and can be set between 0.0000 and 2.0000.

5.3 Linearisation of an input signal

You can linearise an input of the Batching Master in the case of a non-linear sensor. The input to be linearised is selected in function 3.3. The linearisation takes place in the menu 5.0 input linearisation. Possible application is the error correction of a flow sensor.

5.4 Configure pulse output

The settings for the pulse output are made in submenu 3.4.0.

5.5 Select measurement type for pulse output

In menu item 3.4.1 you select which measured variable the pulse output is to output. Volume, mass or standard volume can be selected.

5.5.1 Count or frequency output selection

In menu item 3.4.2 you can set whether the pulse output operates as a counter output or as a frequency output.

5.5.2 Pulse value of the pulse output

In menu item 3.4.3 you set how many pulses to output per last counted digit. You can select switching between 1, 10, 100 or 1000 pulses per last counted digit. The maximum frequency for this function is 150 Hz.

5.6 Frequency of the pulse output

Under 3.4.4 you set the frequency at maximum flow rate (value from 3.2.3). The maximum adjustable frequency is 100.00 Hz. The maximum frequency that can be emitted by the digital output is 150 Hz.

5.7 Monitoring the minimum permissible flow

The custody transfer approval of the connected flow meter specifies its minimum permissible flow rate. If the flow rate is above this minimum limit, the flow rate in the normal meters is added up. If the flow rate falls below this minimum permissible value for a set time, the error message "ERR MIN FLOW" appears in the display and the flow rate is added in the error counter. The settings for this function are made in submenu 3.5.0.

5.7.1 Min flow alarm value

In 3.5.1 you set the minimum permissible flow rate.

5.7.2 Waiting time min flow monitoring

In menu item 3.5.2 you can set the number of seconds after which the error message "ERR MIN-FLOW" should appear after the minimum flow rate has been fallen below. From this point on, the flow rate is added to the error counter.

5.8 Behaviour in the event of an error in printout creation

Under 3.6 you can set whether an error message ("ERROR" setting) is to be issued or not ("Ignore" setting) if the counter readings are printed incorrectly. This function is not available in operation with the PCC 400.

5.9 Communication monitoring of the Modbus slave interface

In menu item 3.7 you can set whether the Modbus slave interface of the device is to be monitored for data traffic. In this parameter you set a delay time how many seconds after the interruption of the data traffic the error message "ERROR Interface" appears at the Pipeline Master. This monitoring function does not cause the error counter to be counted, as the Pipeline Master can still continue to record the counter readings. With the setting 0.0 seconds, this monitoring function is switched off.

5.10 Reset counter A (totaliser)

If you want to delete counter A, switch to "delete" in menu item 3.8. The consecutive number of the printout is set to 0 at the same time. The Pipeline Master must then be switched off and on again.

5.11 Reset counter A with a digital input

Under 3.9. you can assign a digital input, via which the counter A can be reset to 0. For custody transfer instruments, this setting must be set to "OFF". There is no printout when the counter is reset.

5.12 External error via a digital input

In menu item 3.10, a digital input can be selected which is evaluated as an external error. If the digital input switches, the error message "ERR at digital input" appears on the display and the flow rate is added to the error counter. For example, the contact of a gas separator could be connected.

5.13 **Pressure compensation from flow signal**

There are mass flow meters that have a measurement error if the product pressure deviates from the calibration pressure of the instrument. The function in submenu 3.11.0 corrects this error.

5.14 Reset Counters B-F

In function 3.12 you can reset the counters B - F. The consecutive number of the printout is set to 0 at the same time. The Pipeline Master must then be switched off and on.

5.15 Checksum

A checksum of all set parameters is displayed under 3.13.

5.16 Software version custody transfer part

The software version from the custody transfer software part is displayed in function 3.14.

6 Settings in the calibration and test level



This level can only be accessed with the programming switch in the case of certified custody transfer instruments. The seal must be broken to do this.

Please note that, in this level, all outputs may switch and up to 22 mA may flow from the current output. You must ensure that the switching of digital outputs or setting an output current poses no danger to personnel and plant.

6.1 Calibrating current inputs

To calibrate the current inputs, connect a current source to the current input that is to be calibrated.

The three current inputs are calibrated in Functions 4.1.1 to 4.1.6.

Example: calibrating current input 2.

Connect a current source to current input 2 and apply 4 mA. In Function 4.1.3, enter the programming level with [\geq] (display flashes). Returning by pressing [\prec] or [Set] saves the present current as the 0% value.

Now apply a current of 20 mA from the current source. Change to Function 4.1.4 with [\land]. Enter the programming level with [ϑ] (display flashes) and exit this again immediately with [\checkmark]. The 100% value is now saved. The other current inputs are programmed in the same way.

6.2 Calibrating current outputs

To calibrate the current outputs, connect an ammeter to the current output that is to be calibrated.

Enter Function 4.1.7 and change to the programming level with the [\geq] key. Set the current using the [$\wedge \forall$] keys. When the 0% value of 4 mA is reached, exit the programming level using the [\prec] key. Setting of the 100% value setting is performed in Function 4.1.8.

6.3 Testing inputs and outputs

To enable the function of the batching Master to be checked quickly, a test level is included in Functions 4.2.1 to 4.2.12. All the inputs and outputs of the Batching Master can be tested.

Function 4.2.1 tests the digital inputs. Each input is shown on the LCD when activated.

Function 4.2.2 tests the digital outputs. Use number keys 1 to 5 to switch the associated digital output and the LED's in the front panel while the key is held down. Note that this can also take place on site and may consequently initiate undesired actions.

Function 4.2.3 and 4.2.4 can be used to display the present input frequency on the pulse inputs.

Function 4.2.5 checks the pulse inputs for sensor break.

Functions 4.2.6 to 4.2.8 enable the present output current on the three analogue outputs to be displayed.

Functions 4.2.9 to 4.2.11 cause a test current of 4, 12 or 20 mA respectively to be output by the current output. Note that this can also take place on site and may consequently initiate undesired actions.

Function 4.2.12 is used to read the keypad. Each key pressed is shown on the display. This level is exited with the [\ll] key.

Function 4.2.13 carries out an LCD test.

7 Error correction of an input signal

To correct non-linear input signals, use the function "6.0 Linearisation".

Assignment of the input for error correction is carried out in Function 4.3. Only one input can be linearised.

There are 25 nodes available at 5% intervals from -10% to +110%. The nodes in Functions 6.1 to 6.25 specifies the correction at this node. A meter factor of 0.0000 to 2.0000 can be set.

Example:

A flow meter is connected to analogue input 1.

You have determined that, at an output current of 5.6 mA (corresponding to 10% from the maximum flow rate), the sensor does not have a flow rate of 10000 kg/h as expected but only 9000 kg/h. The flow rate must therefore be corrected by a factor of 0.9000.

For error correction select analogue input 1 at function 4.3.

To correct this error, switch to Function 6.5 (node 10%) and change the value from 1,0000 to 0,9000 with the keys [0 to 9].

This change has the result that a current of 5.6 mA is evaluated as a value of 9000 kg/h (real flow rate) at the Batching Master. All nodes set to 1,0000 are not corrected.



Figure 1: Detail of the corrected input signal

8 Flow conversion menu

In the menu 6.0 all settings for flow conversion shall be made.

The flow rate input can be the mass flow or volume flow. This input can be converted to standard volume based at base temperature (mostly 15°C). It is also possible to convert from mass to volume or from volume to mass. Also other base temperature settings can be entered.

This conversions can be done by using the temperature signal, the density signal and/or the pressure signal.

8.1 **Possibilities for the flow conversion:**

Flow input signal	Conversing to:	Conversion method:
volume	mass or standard volume	Method 1, linear
mass	volume or standard volume	Method 1, linear
volume	mass or standard volume	Method 2, API tables
mass	volume or standard volume	Method 2, API tables
volume	mass or standard volume	FAME DIN EN 14214
mass	volume or standard volume	FAME DIN EN 14214

The flow conversion is described in a separate document.

9 Counter settings

The Pipeline Master contains 9 counter blocks (A to I). Counter block A is the totaliser and runs continuously. If the Pipeline Master is a custody transfer meter, counter A must be configured so that it cannot be reset.

The counter blocks B to F can have different functions. These counters can count continuously, and are then cleared with each printout. With batch counts, the counter is reset at batch start and stopped at batch end and the printout is created.

The counters G-I are the three total counters of the Promass 84F or the Promass 300.

9.1 Select individual counter indication for display on the device

In the menu items A1 to A12, various counters of counter block A can be switched on or off for display on the Pipeline Master. In counter block B to F the same settings are possible. For the counter blocks G-I there are only four settings e.g. G1-G4 to choose from.

9.2 Activate average temperature, density and pressure indication

From B...F13 to B...F15 the display of the mean temperature, mean density and mean pressure can be switched on or off. These values are determined on a flow-weighted basis.

9.3 Continuous operation or batch mode

In functions B...F16 is set the meter for continuous operation mode or batch mode.

9.4 Intervals

If a printout is to be made periodically, set the interval in A...I17. You can set the interval to "not periodic", 1x a month, 1x a week, 24, 8, 6, 4, 3, 2 and 1 hour. If the interval is set to "not cyclical", there will be no regular printout, but on request.

9.5 Print at xx:xx o'clock

If e. g. 4:00 o'clock is set in functions A...F18, the first printout happens at 4:00 o'clock. The next printouts happen after the setted interval time.

9.6 Print at (weekday)

If the printout interval in functions A...F17 is set to 1 x week, the printout happen at the weekday set in functions A...F19 and at the time set in function A...F18.

9.7 **Print at x. of month**

If the printout interval in functions A...F17 is set to 1 x month, the printout happens at the day of month set in functions A...F20 and at the time set in function A...F18.

9.8 **Printout with the RESET key**

In the menu items A...I21 you enable the printout of the meter readings via the RE-SET key of the Pipeline Master. As soon as the RESET key is pressed, the Pipeline Master provides a printout. A set code is queried beforehand. This only works if the corresponding counter is shown in the display at that time.

9.9 Intermediate Printout with the SET key

In the menu items A...I22 you enable the printout via the SET key of the Pipeline Master. As soon as the SET key is pressed, the Pipeline Master provides an intermediate printout of the meter readings. A set code is queried beforehand. The counters A...F are not reset. No intermediate printout is available for the G-I counters.

9.10 Printout with digital input

In functions A...I23 the activation of a printout with digital inputs can be enabled. When the digital input is activated, the Pipeline Master stores the actual counter values in a printout block at the Modbus registers.

9.11 **Printout with Modbus flag**

In the menu items A...I24 you enable the control of a printout via a Modbus flag.

The Modbus Holding register addresses listed below must be set to 1 for printing to take place:

```
Holding Register 64 = Remote Printout Request Counter A
Holding Register 65 = Remote Printout Request Counter B
Holding Register 66 = Remote Printout Request Counter C
Holding Register 67 = Remote Printout Request Counter D
Holding Register 68 = Remote Printout Request Counter E
Holding Register 69 = Remote Printout Request Counter F
Holding Register 74 = Remote Printout Request Counter G
Holding Register 75 = Remote Printout Request Counter H
Holding Register 76 = Remote Printout Request Counter I
```

9.12 Batch control

If the type of printout under B...I16 is set to batch mode, you can set the exact type of batch control under B...I25.

With batch control, the counters B-F are reset to 0 at batch start and the counter readings are printed at batch end. For the counters G-I, the start value is stored at batch start and the corresponding end value at batch end.

Under B...I25 the following types of batch control can be selected:

•	SET/RESET	Batch start via the Set key and batch end via the Reset key
•	Dig. Input Level	Batch control is carried out via the digital input selected under BI26. If the digital input switches to "high" the batch starts and if it is set back to "low" the batch ends.
•	Dig. Input Edge	The batch start occurs when the digital input selected un- der BI26 switches to "high". The batch is terminated when the digital input selected under BI27 switches to "high".
•	Modbus	Batch control is performed via the Modbus Holding Register address "Remote Printout Request Counter BI. If the higher-level system writes a 1 to this address, the batch is started. If the higher-level system sets this to 0, the batch is terminated.

9.13 Selecting the digital input for batch start

Under B...I26, the digital input is selected by which the batch started.

9.14 Selecting the digital inputs for batch end

Under B...I27, the digital input is selected by which stops the batch.

9.15 Reset sequential number of printout

In the menu items A...128 you can reset the consecutive number of the selected counter block to 0.

9.16 Text in the display

Under A...F29 you define whether the standard text or a text from the Modbus registers is to be shown in the display of the Pipeline Master as the heading of the meter values. The text from the Modbus registers can be up to 32 characters long. Each 16 characters are shown alternately on the upper display line. The PCC 400 offers the possibility to write these Modbus addresses easily. The counters G-I do not have this possibility.

10 Factory menu

Various software options can be ordered. These options can be enabled in the factory menu. The code is not accessible to users.

These software functions are only present if they were ordered as an option.

10.1 Terminal mode

You can switch the Pipeline Master to terminal mode via the interface. In this operating mode, the higher-level system can display question texts and prompts on the display of the Pipeline Master. The operator on the device can enter data using the numeric keypad and function keys.

The function is described in the Modbus Register manual.

10.2 Flow conversion with temperature, density and pressure

With the volume conversion it is possible to convert between mass, volume and standard volume. This can be done with the current temperature, density and pressure.

The following conversions are available:

- A linear method (PTB method 1)
- A method according to API 2540 in metric units (PTB method 2)
- A special conversion method for biodiesel (DIN EN 14214)

The flow conversion is parametrised in menu 6.0.

10.3 Device number

Every Pipeline Master has a unique device number that was setted at the factory and cannot be changed by the customer.

By pressing the menu key, the device number and the software version is shown for approximately one second.

11 Overview Display Level

Fct.	description	setting range		set value	P .
1.0	display main menu				11
1.1	sub menu counter block B	setting range: factory setting:	ON / OFF ON		11
1.2	sub menu counter block C	setting range: factory setting:	ON / OFF ON		11
1.3	sub menu counter block D	setting range: factory setting:	ON / OFF ON		11
1.4	sub menu counter block E	setting range: factory setting:	ON / OFF ON		11
1.5	sub menu counter block F	setting range: factory setting:	ON / OFF ON		11
1.6	sub menu mass flow	setting range: factory setting:	ON / OFF ON		11
1.7	sub menu volume flow	setting range: factory setting:	ON / OFF ON		11
1.8	sub menu standard volume flow	setting range: factory setting:	ON / OFF ON		11
1.9	sub menu temperature	setting range: factory setting:	ON / OFF ON		11
1.10	sub menu density	setting range: factory setting:	ON / OFF ON		11
1.11	sub menu base density	setting range: factory setting:	ON / OFF ON		11
1.12	sub menu pressure	setting range: factory setting:	ON / OFF ON		11
1.13	sub menu counter block A	setting range: factory setting:	ON / OFF ON		11
1.14	sub menu counter block A	setting range: factory setting:	ON / OFF ON		11
1.15	sub menu counter block A	setting range: factory setting:	ON / OFF ON		11
1.16	sub menu counter block A	setting range: factory setting:	ON / OFF ON		11

12 Overview Structure Level

Fct.	description	sett	ing range	set value	Р.
2.0	main menu structure				12
2.1	Select language	unit: setting range: factory setting:	none German, English, French, German		12
2.2.0	sub menu settings digital inputs				12
2.2.1	direction of action digital input 1	setting range: factory setting:	normally open, normally closed normally open		12
2.2.2	Filter digital input 1	setting range: factory setting:	0,0 s - 100.0 s 0,0 s		12
2.2.3	direction of action digital input 2	setting range: factory setting:	normally open, normally closed normally open		12
2.2.4	Filter digital input 2	setting range: factory setting:	0,0 s - 100.0 s 0,0 s		12
2.2.5	direction of action digital input 3	setting range: factory setting:	normally open, normally closed normally open		12
2.2.6	Filter digital input 3	setting range: factory setting:	0,0 s - 100.0 s 0,0 s		12
2.2.7	direction of action digital input 4	setting range: factory setting:	normally open, normally closed normally open		12
2.2.8	Filter digital input 4	setting range: factory setting:	0,0 s - 100.0 s 0,0 s		12
2.2.9	direction of action digital input 5	setting range: factory setting:	normally open, normally closed normally open		12
2.2.10	Filter digital input 5	setting range: factory setting:	0,0 s - 100.0 s 0,0 s		12
2.3.0	sub menu settings digital outputs				12
2.3.1	function digital output 1	setting range: factory setting:	no function, pulse output, flow alarm, error message, flow direction no function		12

Overview Structure Level

Fct.	description	sett	ing range	set value	Ρ.
2.3.2	direction of action digital output 1	setting range: factory setting:	normally open, normally closed normally open		13
2.3.3	function digital output 2	setting range: factory setting:	no function, pulse output, flow alarm, error message, flow direction no function		12
2.3.4	direction of action digital output 2	setting range: factory setting:	normally open, normally closed normally open		13
2.3.5	function digital output 3	setting range: factory setting:	no function, pulse output, flow alarm, error message, flow direction no function		12
2.3.6	direction of action digital output 3	setting range: factory setting:	normally open, normally closed normally open		13
2.3.7	function digital output 4	setting range: factory setting:	no function, pulse output, flow alarm, error message, flow direction no function		12
2.3.8	direction of action digital output 4	setting range: factory setting:	normally open, normally closed normally open		13
2.3.9	function digital output 5	setting range: factory setting:	no function, pulse output, flow alarm, error message, flow direction no function		12
2.3.10	direction of action digital output 5	setting range: factory setting:	normally open, normally closed normally open		13
2.4.0	sub menu interface settings				13
2.4.1	Protocol 1 (for interface 1)	setting range: factory setting:	MODBUS RTU, MODBUS ASCII RTU		13

Fct.	description	sett	ing range	set value	Ρ.
2.4.2	Address 1 (for interface 1)	setting range: factory setting:	1 to 255 1		13
2.4.3	Baud rate 1 (for interface 1)	setting range: factory setting:	2400, 4800, 9600, 19200, 38400, 76800, 115200 9600		13
2.4.4	function 2 (for interface 2)	setting range: factory setting:	Slave, Promass 84F, Krohne, Optimass, Emerson Micromotion Slave		13
2.4.5	Protocol 2 (for interface 2)	setting range: factory setting:	MODBUS RTU, MODBUS ASCII RTU		13
2.4.6	Address 2 (for interface 2)	setting range: factory setting:	1 to 255 1		14
2.4.7	Baud rate 2 (for interface 2)	setting range: factory setting:	2400, 4800, 9600, 19200, 38400, 57600, 115200 9600		14
2.4.8	Error delay	setting range: factory setting:	0,0s to 999,9s 0,0s		14
2.5.0	sub menu Code input				14
2.5.1	Code display level	setting range: factory setting:	0 to 99999999 0		14
2.5.2	Code structure level	setting range: factory setting:	0 to 99999999 0		14
2.5.3	Code install level	setting range: factory setting:	0 to 99999999 0		14
2.5.4	Code calibration and test level	setting range: factory setting:	0 to 99999999 0		14
2.5.5	Code linearisation	setting range: factory setting:	0 to 99999999 0		14
2.5.6	Code SET key	setting range: factory setting:	0 to 99999999 0		14
2.5.7	Code RESET	setting range: factory setting:	0 to 99999999 0		14
2.6	Flow Alarm	setting range: (decimal point:) to 9999999 x/h from 3.2.2		14

Overview Structure Level

Fct.	description	sett	ing range	set value	Р.
2.7.0	Sensor break Measuring overflow monitoring				14
2.7.1	Sensor break pulse input 1	setting range: factory setting:	ON, OFF OFF		
2.7.2	Sensor break pulse input 2	setting range: factory setting:	ON, OFF OFF		
2.7.3	Sensor break current input 1	setting range: factory setting:	ON, OFF OFF		
2.7.4	Sensor break current input 2	setting range: factory setting:	ON, OFF OFF		
2.7.5	Sensor break current input 3	setting range: factory setting:	ON, OFF OFF		
2.7.6	measuring overflow monitoring current input 1	setting range: factory setting:	ON, OFF OFF		
2.7.7	measuring overflow monitoring current input 2	setting range: factory setting:	ON, OFF OFF		
2.7.8	measuring overflow monitoring current input 3	setting range: factory setting:	ON, OFF OFF		
2.8	Print errors	setting range: factory setting:	no printout at error at error change no printout		15
2.9.0	Current output				
2.9.1	Function	setting range: factory setting:	no function density temperature pressure mass flow volume flow std. volume flow no function		
2.9.2	Flow 100%	setting range: decimal points	0 to 9999999 x/h off 3.2.2		
2.9.3	Filter	setting range: factory setting:	0 to 99 s 1,0 s		

13 Overview Install Level

Fct.	description	setting range		cription setting range set va		set value	P .
3.0	main menu install				16		
3.1.0	sub menu measuring signals				16		
3.1.1	input for flow signal:	setting range: factory setting:	pulse input 1 double pulse 4 – 20mA input 1 MODBUS slave MODBUS master pulse input 1		16		
3.1.2	input for temperature signal:	setting range: factory setting:	no input 4 – 20mA input 1 4 – 20mA input 2 4 – 20mA input 3 MODBUS slave MODBUS master no input		16		
3.1.3	input for density signal:	setting range:	no input 4 – 20mA input 1 4 – 20mA input 2 4 – 20mA input 3 MODBUS slave MODBUS master pulse input 2 no input		16		
3.1.4	input for pressure signal:	setting range: factory setting:	no input 4 – 20mA input 1 4 – 20mA input 2 4 – 20mA input 3 MODBUS slave MODBUS master no input		16		
3.2.0	sub menu measuring range				16		
3.2.1	flow unit	setting range: factory setting:	kg, g, mg, l, ml, m³, t no unit kg		16		
3.2.2	decimal point:	setting range: factory setting:	0000 000.0 00.00 0.000 0000		16		

Fct.	description	sett	ing range	set value	P .
3.2.3	end of scale value	setting range: unit: factory setting:	1 to 9999999 from 4.2.1 100000		16
3.2.4	increment per pulse	setting range: factory setting: The setting rang	1 to 9999,999 10,000 je is for the last digit.		17
3.2.5	error pulse / x pulses allowed	setting range: factory setting:	1 to 999999 1		17
3.2.6	flow direction	setting range:	always forward automatically digital input 1 digital input 2 digital input 3 digital input 4 digital input 5		17
3.2.7	meter factor	setting range: factory setting:	0,0000 to 2,0000 1,0000		17
3.3	select input for linearisation	setting range: factory setting:	no input pulse input current input 1 current input 2 current input 3 flow input no input		17
3.4.0	sub menu pulse ratio or frequency of pulse output				17
3.4.1	count pulses or frequency	setting range: factory setting:	count pulse, frequency count pulse		17
3.4.2	increment per pulse of pulse output	setting range: factory setting:	1, 10, 100, 1000 1		17
3.4.3	frequency at maximum flow	setting range: factory setting:	1.00 to 100.00Hz 100 Hz		17
3.5.0	sub menu monitoring the flow				18
3.5.1	minimum permissible flow	setting range: factory setting:	0 to 9999999 0		18
3.5.2	maximum time for minimum flow	setting range: unit: factory setting:	0 to 9999999 s 0 = OFF.		18
3.6	printer error	setting range: factory setting:	ERROR ignore ERROR		18

Fct.	description	sett	ting range	set value	Р.
3.7	monitoring communication	setting range: factory setting:	0 to 100 s 0 s		18
3.8	reset totaliser	setting range: factory setting:	do not delete delete do not delete		18
3.9	totaliser reset with	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		18
3.10	external error	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		18
3.11	pressure compensation				18
3.11.1	correction factor	setting range: 0, factory setting:	,0000 – 10,0000 %/bar 0 %/bar		18
3.11.2	calibration pressure	setting range: factory setting:	0,00 – 100,00 bar 0,00 bar		18
3.12	delete counters B-I	setting range:	do not delete delete		18
3.13	Checksum parameter	displayed the ch	necksum		19
3.14	Software version custody transfer part				19

14 Overview Calibration and Test Level

Fct.	description	setting range		P .
4.0	main menu calibr. / test	Main menu calibration / test After pressing ≽ for entering this menu, there is displayed a warning about 2 seconds in the display. After this you can enter with ≽ the next level. For custody transfer units, changes are only possible when the custody transfer switch is deactivated.		20
4.1	sub menu calibration current inputs and outputs	Sub menu calibration current inputs and output		20
4.1.1	calibration current input 1 4 mA	Connect 4 mA to current input 1. Enter the programming level by pressing ≽. The display flashed. To confirm the current press ≺ or [Set]. To calibrate the next selection press ∧or∀.		20
4.1.2	calibration current input 1 20 mA	Connect 20 mA to current input 1. Enter the programming level by pressing ≽. The display flashed. To confirm the current press ≺ or [Set]. To calibrate the next selection press ∧or∀.		20
4.1.3	calibration current input 2 4 mA	Connect 4 mA to current input 2. Enter the programming level by pressing ≽. The display flashed. To confirm the current press ≺ or [Set]. To calibrate the next selection press ∧or∀.		20
4.1.4	calibration current input 2 20 mA	Connect 20 mA to current input 2. Enter the programming level by pressing ≽. The display flashed. To confirm the current press ≺ or [Set]. To calibrate the next selection press ∧or∀.		20
4.1.5	calibration current input 3 4 mA	Connect 4 mA to current input 3. Enter the programming level by pressing ≽. The display flashed. To confirm the current press ≺ or [Set]. To calibrate the next selection press ∧or∀.		20
4.1.6	Calibration current input 3 20 mA	Connect 20 mA to current input 3. Enter the programming level by pressing ≽. The display flashed. To confirm the current press ≺ or [Set]. To calibrate the next selection press ∧or∀.		20
4.1.7	calibration current output 4 mA	A multimeter has to be connect to the analogue output. Enter the programming level by pressing ≽. The display flashed. Set the current with ▲ ♥ to 4 mA. To confirm the current press ◄ or [Set]. To calibrate the next selection press ▲ or ♥.		20

Fct.	description	setting range	set value	Р.
4.1.8	calibration current output 20 mA	A multimeter has to be connect to the analogue output. Enter the programming level by pressing ≽. The display flashed. Set the current with A ✓ to 20 mA. To confirm the current press ≺ or [Set]. To choose the next selection press ∧or ∀.		20
4.2.0	sub menu test	sub menu 5.2.0 test		20
4.2.1	digital inputs	Each activated digital input is shown as a number in the upper display.		20
4.2.2	digital outputs	With the keys 1 to 5 the digital outputs 1 to 5 are switched for the time of the key pressure.		20
4.2.3	pulse input 1	The actual input frequency at pulse input 1 is shown.		20
4.2.4	pulse input 2	The actual input frequency at pulse input 1 is shown.		20
4.2.5	sensor break	A sensor break at pulse input 1 or 2 is shown.		20
4.2.6	current input 1	The currently active input current at analogue input 1 is displayed.		20
4.2.7	current input 2	The currently active input current at analogue input 2 is displayed.		20
4.2.8	current input 3	The currently active input current at analogue input 3 is displayed.		20
4.2.9	current 4 mA	There are 4 mA at the current output.		20
4.2.10	current 12 mA	There are 12 mA at the current output.		20
4.2.11	current 20 mA	There are 20 mA at the current output.		20
4.2.12	keyboard test	The test level is entered with \succ . Each key pressed is displayed. For the RC, F1, F2 and F3 keys, the LEDs also light up. Press \prec to leave the test level and press \land or \forall to the next submenu.		20
4.2.12	LCD test	To enter the test level press \succ . To quit this level press \blacktriangleleft .		20

15 Overview Linearisation

Fct.	description	setting range	set value	Р.
5.0	main menu linearisation			22
5.1	support point –10 %	setting range: 0,0000 to 2,0000 factory setting: 1,0000		22
5.2	support point –5 %	as 5.1		22
5.3	support point 0 %	as 5.1		22
5.4	support point 5 %	as 5.1		22
5.5	support point 10 %	as 5.1		22
5.6	support point 15 %	as 5.1		22
5.7	support point 20 %	as 5.1		22
5.8	support point 25 %	as 5.1		22
5.9	support point 30 %	as 5.1		22
5.10	support point 35 %	as 5.1		22
5.11	support point 40 %	as 5.1		22
5.12	support point 45 %	as 5.1		22
5.13	support point 50 %	as 5.1		22
5.14	support point 55 %	as 5.1		22
5.15	support point 60 %	as 5.1		22
5.16	support point 65 %	as 5.1		22
5.17	support point 70 %	as 5.1		22
5.18	support point 75 %	as 5.1		22
5.19	support point 80 %	as 5.1		22
5.20	support point 85 %	as 5.1		22
5.21	support point 90 %	as 5.1		22
5.22	support point 95 %	as 5.1		22

Fct.	description	setting range	set value	P .
5.23	support point 100 %	as 5.1		22
5.24	support point 105 %	as 5.1		22
5.25	support point 110 %	as 5.1		22

16 Overview Flow Conversion

Fct.	description	set	ting range	set value	P .
6.0	main menu flow conversion				23
6.1	temperature				
6.1.1	calculation	setting range: factory setting:	method 1 linear method 2 API biodiesel (DIN EN 14214) method 1 linear		
6.1.2	temperature 0%	setting range: factory setting:	-200,0 to + 600,0 °C 0,0°C		
6.1.3	temperature 100%	setting range: factory setting:	-200,0 to + 600,0 °C 100,0°C		
6.1.4	average correction factor	0,000			
6.1.5	error mode	setting range: factory setting:	last average, error value		
6.1.6	error value	setting range: factory setting:	$\begin{array}{c} 0000,00-2000,00 \ ^{kg}/_{m^{3}} \\ 1000,00 \ ^{kg}/_{m^{3}} \end{array}$		
6.2	density				
6.2.1	calculation	setting range: factory setting:	fixed value from analogue input calculate density from analogue input		
6.2.2	density 0%	setting range: factory setting:	0000,00 - 2000,00 1000,0 ^{kg} /m ³		_
6.2.3	density 100%	setting range: factory setting:	0000,00 - 2000,00 1000,0 ^{kg} /m ³		
6.2.4	standard density	setting range: factory setting: if 0 then calculat	0000,00 - 2000,00 ^{kg} /m³ 1000,00 e		
6.2.5	standard temperature	setting range: factory setting:	000 – 100 °C 15 °C		
6.2.6	α ₀	$0.00000 * 10^{-3}$ /k if 0 then K ₀ , K ₁ K	ζ_2 for calculation		
6.2.7	K ₀	0000,0000			
6.2.8	K ₁	0,0000			

Fct.	description	setting range	set value	Р.
6.2.9	K ₂	-0,0000000		
6.2.10	fixed density	setting range: 0000,00 – 2000,00 ^{kg} / _{m³} factory setting: 1000,00		
6.2.11	error mode	setting range: last average, error value factory setting:		
6.2.12	error value	setting range: 0000,00 - 2000,00 kg/m³ factory setting: 1000,00 kg/m³		
6.3	pressure			
6.3.1	calculation	setting range: OFF, manual correction, method 1 linear correction, method 2 API crude + ref., method 2 API special products factory setting: OFF		
6.3.2	pressure 0%	setting range: -1,00 to + 100,00 bar factory setting: 0,00 bar		
6.3.3	pressure 100%	setting range: -1,00 to + 100,00 bar factory setting: 100,00 bar		
6.3.4	Cplm man.	setting range: 0,000001 to 2,000000 factory setting: 1,000000		
6.3.5	Pressure correction	setting range: 0,000001 to 2,000000 factory setting: 1,000000		
6.3.6	reference pressure	factory setting: 1,01325 bar		
6.3.7	error mode	setting range: average, error value factory setting:		
6.3.8	error value	$\begin{array}{llllllllllllllllllllllllllllllllllll$		

17 Overview Counter A (Totaliser)

Fct.	description	setting range		set value	Р.
A.0	main menu counter A				24
A.1	mass counter	setting range: factory setting:	ON / OFF ON		24
A.2	volume counter	setting range: factory setting:	ON / OFF ON		24
A.3	base volume counter	setting range: factory setting:	ON / OFF ON		24
A.4	error counter mass	setting range: factory setting:	ON / OFF ON		24
A.5	error counter volume	setting range: factory setting:	ON / OFF ON		24
A.6	error counter standard volume	setting range: factory setting:	ON / OFF ON		24
A.7	reverse counter mass	setting range: factory setting:	ON / OFF ON		24
A.8	reverse counter volume	setting range: factory setting:	ON / OFF ON		24
A.9	reverse counter standard volume	setting range: factory setting:	ON / OFF ON		24
A.10	reverse error counter mass	setting range: factory setting:	ON / OFF ON		24
A.11	reverse error counter volume	setting range: factory setting:	ON / OFF ON		24
A.12	reverse error counter standard volume	setting range: factory setting:	ON / OFF ON		24
A.17	interval	setting range: factory setting:	not cyclical 1 x in the month 1 x in the week 24 hr. 12 hr. 8 hr. 6 hr. 4 hr. 3 hr. 2 hr. 1 hr. not cyclical		24
A.18	printout at::	setting range: factory setting:	0:00 to 23:59 0:00		24

Fct.	description	set	ting range	set value	P .
A.19	printout at:	setting range: factory setting:	Monday, Tuesday Wednesday Thursday Friday Saturday Sunday Monday		24
A.20	printout at x from month	setting range: factory setting:	1 to 31 1		24
A.21	printout RESET key	setting range: factory setting:	ON / OFF ON		25
A.22	printout SET key	setting range: factory setting:	ON / OFF ON		25
A.23	printout digital input	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		25
A.24	printout Modbus flag	setting range: factory setting:	ON / OFF ON		25
A.28	reset sequential number	setting range: factory setting:	ON / OFF OFF		26
A.29	text display	setting range: factory setting:	standard text Modbus register standard text		26

18 Overview Counter B

Fct.	description	set	ting range	set value	Р.
B.0	main menu counter B				24
B.1	mass counter	setting range: factory setting:	ON / OFF ON		24
B.2	volume counter	setting range: factory setting:	ON / OFF ON		24
B.3	base volume counter	setting range: factory setting:	ON / OFF ON		24
B.4	error counter mass	setting range: factory setting:	ON / OFF ON		24
B.5	error counter volume	setting range: factory setting:	ON / OFF ON		24
B.6	error counter standard volume	setting range: factory setting:	ON / OFF ON		24
B.7	reverse counter mass	setting range: factory setting:	ON / OFF ON		24
B.8	reverse counter volume	setting range: factory setting:	ON / OFF ON		24
B.9	reverse counter standard volume	setting range: factory setting:	ON / OFF ON		24
B.10	reverse error counter mass	setting range: factory setting:	ON / OFF ON		24
B.11	reverse error counter volume	setting range: factory setting:	ON / OFF ON		24
B.12	reverse error counter standard volume	setting range: factory setting:	ON / OFF ON		24
B.13	average temperature	setting range: factory setting:	ON / OFF ON		24
B.14	average density	setting range: factory setting:	ON / OFF ON		24
B15	average pressure	setting range: factory setting:	ON / OFF ON		24
B.16	printout	setting range: factory setting:	continuously Batch Mode continuously		24

Fct.	description	set	ting range	set value	Р.
B.17	interval	setting range: factory setting:	not cyclical 1 x in the month 1 x in the week 24 hr. 12 hr. 8 hr. 6 hr. 4 hr. 3 hr. 2 hr. 1 hr. not cyclical		24
B.18	printout at::	setting range: factory setting:	0:00 to 23:59 0:00		24
B.19	printout at:	setting range: factory setting:	Monday, Tuesday Wednesday Thursday Friday Saturday Sunday Monday		24
B.20	printout at x from month	setting range: factory setting:	1 to 31 1		24
B.21	printout RESET key	setting range: factory setting:	ON / OFF ON		25
B.22	printout SET key	setting range: factory setting:	ON / OFF ON		25
B.23	printout digital input	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		25
B.24	printout Modbus flag	setting range: factory setting:	ON / OFF ON		25
B.25	batch control	setting range: factory setting:	OFF Set/Reset digital input level digital input flank Modbus OFF		25

Fct.	description	set	ting range	set value	P .
B.26	batch start	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		25
B.27	batch end	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		26
B.28	reset sequential number	setting range: factory setting:	ON / OFF OFF		26
B.29	text display	setting range: factory setting:	standard text Modbus register standard text		26

19 Overview Counter C

Fct.	description	set	ting range	set value	Р.
C.0	main menu counter C				24
C.1	mass counter	setting range: factory setting:	ON / OFF ON		24
C.2	volume counter	setting range: factory setting:	ON / OFF ON		24
C.3	base volume counter	setting range: factory setting:	ON / OFF ON		24
C.4	error counter mass	setting range: factory setting:	ON / OFF ON		24
C.5	error counter volume	setting range: factory setting:	ON / OFF ON		24
C.6	error counter standard volume	setting range: factory setting:	ON / OFF ON		24
C.7	reverse counter mass	setting range: factory setting:	ON / OFF ON		24
C.8	reverse counter volume	setting range: factory setting:	ON / OFF ON		24
C.9	reverse counter standard volume	setting range: factory setting:	ON / OFF ON		24
C.10	reverse error counter mass	setting range: factory setting:	ON / OFF ON		24
C.11	reverse error counter volume	setting range: factory setting:	ON / OFF ON		24
C.12	reverse error counter standard volume	setting range: factory setting:	ON / OFF ON		24
C.13	interval	setting range: factory setting:	not cyclical 1 x in the month 1 x in the week 24 hr. 12 hr. 8 hr. 6 hr. 4 hr. 3 hr. 2 hr. 1 hr. not cyclical		24
C.14	printout at::	setting range: factory setting:	0:00 to 23:59 0:00		24

Fct.	description	set	ting range	set value	P .
C15	printout at:	setting range: factory setting:	Monday, Tuesday Wednesday Thursday Friday Saturday Sunday Monday		24
C.16	printout at x from month	setting range: factory setting:	1 to 31 1		24
C.17	printout RESET key	setting range: factory setting:	ON / OFF ON		24
C.18	printout SET key	setting range: factory setting:	ON / OFF ON		24
C.19	printout digital input	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		24
C.20	printout Modbus flag	setting range: factory setting:	ON / OFF ON		24
C.21	printout RESET key	setting range: factory setting:	ON / OFF ON		25
C.22	printout SET key	setting range: factory setting:	ON / OFF ON		25
C.23	printout digital input	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		25
C.24	printout Modbus flag	setting range: factory setting:	ON / OFF ON		25
C.25	batch control	setting range: factory setting:	OFF Set/Reset digital input level digital input flank Modbus OFF		25

Fct.	description	set	ting range	set value	Р.
C.26	batch start	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		25
C.27	batch end	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		26
C.28	reset sequential number	setting range: factory setting:	ON / OFF OFF		26
C.29	text display	setting range: factory setting:	standard text Modbus register standard text		26

20 Overview Counter D

Fct.	description	set	ting range	set value	Р.
D.0	main menu counter D				24
D.1	mass counter	setting range: factory setting:	ON / OFF ON		24
D.2	volume counter	setting range: factory setting:	ON / OFF ON		24
D.3	base volume counter	setting range: factory setting:	ON / OFF ON		24
D.4	error counter mass	setting range: factory setting:	ON / OFF ON		24
D.5	error counter volume	setting range: factory setting:	ON / OFF ON		24
D.6	error counter standard volume	setting range: factory setting:	ON / OFF ON		24
D.7	reverse counter mass	setting range: factory setting:	ON / OFF ON		24
D.8	reverse counter volume	setting range: factory setting:	ON / OFF ON		24
D.9	reverse counter standard volume	setting range: factory setting:	ON / OFF ON		24
D.10	reverse error counter mass	setting range: factory setting:	ON / OFF ON		24
D.11	reverse error counter volume	setting range: factory setting:	ON / OFF ON		24
D.12	reverse error counter standard volume	setting range: factory setting:	ON / OFF ON		24
D.13	interval	setting range: factory setting:	not cyclical 1 x in the month 1 x in the week 24 hr. 12 hr. 8 hr. 6 hr. 4 hr. 3 hr. 2 hr. 1 hr. not cyclical		24
D.14	printout at::	setting range: factory setting:	0:00 to 23:59 0:00		24

Fct.	description	set	ting range	set value	P .
B15	printout at:	setting range: factory setting:	Monday, Tuesday Wednesday Thursday Friday Saturday Sunday Monday		24
D.16	printout at x from month	setting range: factory setting:	1 to 31 1		24
D.17	printout RESET key	setting range: factory setting:	ON / OFF ON		24
D.18	printout SET key	setting range: factory setting:	ON / OFF ON		24
D.19	printout digital input	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		24
D.20	printout Modbus flag	setting range: factory setting:	ON / OFF ON		24
D.21	printout RESET key	setting range: factory setting:	ON / OFF ON		25
D.22	printout SET key	setting range: factory setting:	ON / OFF ON		25
D.23	printout digital input	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		25
D.24	printout Modbus flag	setting range: factory setting:	ON / OFF ON		25
D.25	batch control	setting range: factory setting:	OFF Set/Reset digital input level digital input flank Modbus OFF		25

Fct.	description	set	ting range	set value	P .
D.26	batch start	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		25
D.27	batch end	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		26
D.28	reset sequential number	setting range: factory setting:	ON / OFF OFF		26
D.29	text display	setting range: factory setting:	standard text Modbus register standard text		26

21 Overview Counter E

Fct.	description	set	ting range	set value	Ρ.
E.0	main menu counter E				24
E.1	mass counter	setting range: factory setting:	ON / OFF ON		24
E.2	volume counter	setting range: factory setting:	ON / OFF ON		24
E.3	base volume counter	setting range: factory setting:	ON / OFF ON		24
E.4	error counter mass	setting range: factory setting:	ON / OFF ON		24
E.5	error counter volume	setting range: factory setting:	ON / OFF ON		24
E.6	error counter standard volume	setting range: factory setting:	ON / OFF ON		24
E.7	reverse counter mass	setting range: factory setting:	ON / OFF ON		24
E.8	reverse counter volume	setting range: factory setting:	ON / OFF ON		24
E.9	reverse counter standard volume	setting range: factory setting:	ON / OFF ON		24
E.10	reverse error counter mass	setting range: factory setting:	ON / OFF ON		24
E.11	reverse error counter volume	setting range: factory setting:	ON / OFF ON		24
E.12	reverse error counter standard volume	setting range: factory setting:	ON / OFF ON		24
E.13	interval	setting range: factory setting:	not cyclical 1 x in the month 1 x in the week 24 hr. 12 hr. 8 hr. 6 hr. 4 hr. 3 hr. 2 hr. 1 hr. not cyclical		24
E.14	printout at::	setting range: factory setting:	0:00 to 23:59 0:00		24

Fct.	description	set	ting range	set value	Ρ.
B15	printout at:	setting range: factory setting:	Monday, Tuesday Wednesday Thursday Friday Saturday Sunday Monday		24
E.16	printout at x from month	setting range: factory setting:	1 to 31 1		24
E.17	printout RESET key	setting range: factory setting:	ON / OFF ON		24
E.18	printout SET key	setting range: factory setting:	ON / OFF ON		24
E.19	printout digital input	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		24
E.20	printout Modbus flag	setting range: factory setting:	ON / OFF ON		24
E.21	printout RESET key	setting range: factory setting:	ON / OFF ON		25
E.22	printout SET key	setting range: factory setting:	ON / OFF ON		25
E.23	printout digital input	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		25
E.24	printout Modbus flag	setting range: factory setting:	ON / OFF ON		25
E.25	batch control	setting range: factory setting:	OFF Set/Reset digital input level digital input flank Modbus OFF		25

Fct.	description	set	ting range	set value	P .
E.26	batch start	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		25
E.27	batch end	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		26
E.28	reset sequential number	setting range: factory setting:	ON / OFF OFF		26
E.29	text display	setting range: factory setting:	standard text Modbus register standard text		26

22 Overview Counter F

Fct.	description	set	ting range	set value	P .
F.0	main menu counter F				24
F.1	mass counter	setting range: factory setting:	ON / OFF ON		24
F.2	volume counter	setting range: factory setting:	ON / OFF ON		24
F.3	base volume counter	setting range: factory setting:	ON / OFF ON		24
F.4	error counter mass	setting range: factory setting:	ON / OFF ON		24
F.5	error counter volume	setting range: factory setting:	ON / OFF ON		24
F.6	error counter standard volume	setting range: factory setting:	ON / OFF ON		24
F.7	reverse counter mass	setting range: factory setting:	ON / OFF ON		24
F.8	reverse counter volume	setting range: factory setting:	ON / OFF ON		24
F.9	reverse counter standard volume	setting range: factory setting:	ON / OFF ON		24
F.10	reverse error counter mass	setting range: factory setting:	ON / OFF ON		24
F.11	reverse error counter volume	setting range: factory setting:	ON / OFF ON		24
F.12	reverse error counter standard volume	setting range: factory setting:	ON / OFF ON		24
F.13	interval	setting range: factory setting:	not cyclical 1 x in the month 1 x in the week 24 hr. 12 hr. 8 hr. 6 hr. 4 hr. 3 hr. 2 hr. 1 hr. not cyclical		24
F.14	printout at::	setting range: factory setting:	0:00 to 23:59 0:00		24

Fct.	description	set	ting range	set value	Р.
B15	printout at:	setting range: factory setting:	Monday, Tuesday Wednesday Thursday Friday Saturday Sunday Monday		24
F.16	printout at x from month	setting range: factory setting:	1 to 31 1		24
F.17	printout RESET key	setting range: factory setting:	ON / OFF ON		24
F.18	printout SET key	setting range: factory setting:	ON / OFF ON		24
F.19	printout digital input	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		24
F.20	printout Modbus flag	setting range: factory setting:	ON / OFF ON		24
F.21	printout RESET key	setting range: factory setting:	ON / OFF ON		25
F.22	printout SET key	setting range: factory setting:	ON / OFF ON		25
F.23	printout digital input	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		25
F.24	printout Modbus flag	setting range: factory setting:	ON / OFF ON		25
F.25	batch control	setting range: factory setting:	OFF Set/Reset digital input level digital input flank Modbus OFF		25

Fct.	description	set	ting range	set value	Р.
F.26	batch start	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		25
F.27	batch end	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		26
F.28	reset sequential number	setting range: factory setting:	ON / OFF OFF		26
F.29	text display	setting range: factory setting:	standard text Modbus register Standard-bearer		26

23 Overview Counter G

Fct.	description	set	ting range	set value	P .
G.0	main menu counter F				24
G.1	counter value	setting range: factory setting:	ON / OFF ON		24
G.2	counter value	setting range: factory setting:	ON / OFF ON		24
G.3	counter value	setting range: factory setting:	ON / OFF ON		24
G.4	counter value	setting range: factory setting:	ON / OFF ON		24
G.16	printout	setting range: factory setting:	continuously batch mode continuously		24
G.17	interval	setting range: factory setting:	non-periodic 1 x per month 2 x per week 24 hours 24 hours 12 hours 8 hours 6 hours 4 hours 3 hours 2 hours 1 hour non-periodic		
G.18	printout at:	setting range: factory setting:	0:00 to 23:59 0:00		
G.19	printout at:	setting range: factory setting:	Monday Tuesday Wednesday Thursday Friday Saturday Sunday Monday		
G.20	printout at x from month	setting range: factory setting:	1 to 31 1		
G.21	printout with RESET key	setting range: factory setting:	ON / OFF ON		

Fct.	description	set	ting range	set value	P .
G.23	printout digital input	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		
G.24	printout Modbus flag	setting range: factory setting:	ON / OFF ON		
G.25	batch control	setting range: factory setting:	OFF Set/Reset digital input level digital input flank Modbus OFF		
G.26	batch start	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		
G.27	batch end	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		
G.28	reset sequential number	setting range: factory setting:	ON / OFF OFF		

24 Overview Counter H

Fct.	description	set	ting range	set value	P .
H.0	main menu counter F				24
H.1	counter value	setting range: factory setting:	ON / OFF ON		24
G.2	counter value	setting range: factory setting:	ON / OFF ON		24
H.3	counter value	setting range: factory setting:	ON / OFF ON		24
H.4	counter value	setting range: factory setting:	ON / OFF ON		24
H.16	printout	setting range: factory setting:	continuously batch mode continuously		24
H.17	interval	setting range: factory setting:	non-periodic 1 x per month 2 x per week 24 hours 24 hours 12 hours 8 hours 6 hours 4 hours 3 hours 2 hours 1 hour non-periodic		
H.18	printout at:	setting range: factory setting:	0:00 to 23:59 0:00		
H.19	printout at:	setting range: factory setting:	Monday Tuesday Wednesday Thursday Friday Saturday Sunday Monday		
H.20	printout at x from month	setting range: factory setting:	1 to 31 1		
H.21	printout with RESET key	setting range: factory setting:	ON / OFF ON		

Fct.	description	set	ting range	set value	P .
H.23	printout digital input	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		
H.24	printout Modbus flag	setting range: factory setting:	ON / OFF ON		
H.25	batch control	setting range: factory setting:	OFF Set/Reset digital input level digital input flank Modbus OFF		
H.26	batch start	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		
H.27	batch end	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		
H.28	reset sequential number	setting range: factory setting:	ON / OFF OFF		

25 Overview Counter I

Fct.	description	set	ting range	set value	P .
1.0	main menu counter F				24
l.1	counter value	setting range: factory setting:	ON / OFF ON		24
1.2	counter value	setting range: factory setting:	ON / OFF ON		24
1.3	counter value	setting range: factory setting:	ON / OFF ON		24
1.4	counter value	setting range: factory setting:	ON / OFF ON		24
I.16	printout	setting range: factory setting:	continuously batch mode continuously		24
I.17	interval	setting range: factory setting:	non-periodic 1 x per month 2 x per week 24 hours 24 hours 12 hours 8 hours 6 hours 4 hours 3 hours 2 hours 1 hour non-periodic		
I.18	printout at:	setting range: factory setting:	0:00 to 23:59 0:00		
I.19	printout at:	setting range: factory setting:	Monday Tuesday Wednesday Thursday Friday Saturday Sunday Monday		
1.20	printout at x from month	setting range: factory setting:	1 to 31 1		
I.21	printout with RESET key	setting range: factory setting:	ON / OFF ON		

Fct.	description	set	ting range	set value	P .
1.23	printout digital input	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		
1.24	printout Modbus flag	setting range: factory setting:	ON / OFF ON		
1.25	batch control	setting range: factory setting:	OFF Set/Reset digital input level digital input flank Modbus OFF		
1.26	batch start	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		
1.27	batch end	setting range: factory setting:	OFF digital input 1 digital input 2 digital input 3 digital input 4 digital input 5 OFF		
1.28	reset sequential number	setting range: factory setting:	ON / OFF OFF		