HEAT CONSUMPTION
ENERGYFLOW COMPUTER

DigiFlow 516

Softwareversion: 1.10 and up

INTRA-AUTOMATION GmbH
Meß- und Regelinstrumente
Otto-Hahn-Straße 20
41515 Grevenbroich

Tel.: (49) 21 81/6 87 61
Fax: (49) 21 81/6 44 92
Telex: 8 517 226 INTA
eMail: INTRA-Automation@T-Online.de

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Directory:

Note.
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These instructions do not claim to cover all details or variations in equipment, nor to provide for every possible contingency that may arise during installation, operation or maintenance.
Should further information be desired or should particular problems arise that are not covered sufficiently for the Purchaser's purposes, the matter should be referred to the local INTRA Sales Office.
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1 Introduction

The **DigiFlow 516** is designed to measure the heat flow and energy consumtion of a system which is troughflown by a gaseous or fluid medium.

Flow input signals can be of different characteristics. Possible are 4-20mA current signals or frequency signals. These signals are output of different flowmeters, like (**VORTEX**), turbine, orifice plates or **ITABAR**-Flow sensors.

Nonlinearities of transmitters are linearized internally. Standard linearizations are square root or square. But also arbitrary exponents of an exponential linearization can be chosen. If the input signal isn't by means of this functions, linearization can be programmed by using of a 12 point transformation curve.

To increase the range over which the flow can be measured, two differential pressure transmitters with different spans can be connected across a common flow sensor. This feature is called split range.

Alternatively two signals of two transmitters can be calculated into one weighted added medium value.

Normally the unit will be delivered with one fully scaleable pulse outputs and an RS232 communication Port. Optionally there is available:

- RS485 – Communication Port alternatively.

The serial port offers the possibility to output the actual volume and energy flow as well as the accumulated totals. Therefor the unit can, in conjunction with any data terminal like Printer or PC, be used to protocolize the batch processes.

2 Variants

Code	Option or Feature
516	**Gas- and Steam Flow Computer, Type: DigiFlow 516**

Code	**Housing**
S	Panel mounting IP54 (Standard)
T	Panel mounting with lockable transparent door IP55

Code	**Power Supply**
2	230 V AC mains (Standard)
1	115 V AC mains
4	24 V AC/DC

Code	**Analog Output**
X	No Analog Output
1	One Analog Output
2	Two Analog Output

Code	**Communication Port**
2	RS232 - Serial Interface (Standard)
4	RS485 - Multipoint Serial Interface

Code	**Sensor-Purge-Unit**
S	Without Relay Output
L	With Relay Output for Sensor Purge Unit

3 Technical data

General:

Display:	Backlighted, alphanumeric LC–Display, 2 rows, 16 cols. Each char is 0.276" high.
Keyboard:	Sealed membrane keyboard with four keys.
Transmitter supply:	18 V / 100 mA; via keyboard adjustable, isolated.
Power:	115/230 V AC; 50/60 Hz internally switchable. Optionally 24-28 V AC/DC Power consumption 10 W @ 230 V AC without Options.
Operating Temperature:	32 – 131 °F
Housing:	Enclosure: glass–fiber reinforced synthetic material; Front: aluminum keyboard membrane.
Face:	Watertight to IP 54 (NEMA 4X equal)
Dimensions:	5.7" W × 2.8" H × 5.1" D
Panel cutout:	5.4" W × 2.6" H

Programming and Configuration:

Handheld:	There is no handheld terminal required. All necessary constants and parameters are programmed using the keypad.
Language:	German, English or French selectable.

Frequency Input:

Frequency Range:	0.25 - 10 kHz Input 1. 0.25 - 500 Hz Input 2.
Input Circuits:	Most AC, logic and proximity switches accepted. 0.5 – 50 V_{pp}.
Non–Linear Correction:	Up to 12 points for curve fit.

Analog Input 4 – 20 mA:

Inputs:	2 for flow (split range), 1 for pressure, and 1 for temperature, for flow correction, or 2 for flow (split range) and 2 for pressure for energy–balance.
Input Impedance:	120 Ω.
Circuit:	All inputs are isolated, no common ground.

RTD Input:

Range:	-310 to +1472°F.
RTD Type:	Pt100 according to DIN 43760.
Non–Linear Correction:	The non–linearity of the RTD is internally compensated.

Pressure Input:

Type:	Absolute or gauge.
Span:	The pressure at 4mA and 20mA are programmable. Linear interpolation for all other points.
Atmospheric pressure:	If a gauge pressure sensor is used, the atmospheric pressure must be entered.

Pulse Output:

Pulse Width:	Adjustable between 10 ms and 90 ms.
Duty Cycle:	≥ 1 : 1.
Logic:	Open Collector, Active Low.
Current sinking:	max. 100 mA.
Pulse generation:	The pulse count is proportional to the counter difference in selectable units of 10 (1, 10, 100, ...100000).

External Keyboard:

Function:	One input controls the display and one input resets the total-counters.
Circuit:	An input voltage higher than +18 V is detected.

Communication Port:

Type:	An RS232 interface is provided. Optionally there is a RS485 multipoint communication interface for up to 32 instruments connected to a common bus.
Baud Rate:	300 – 9600 Baud.
Data Bits:	7 or 8 selectable.
Parity:	None, even or odd.
Stop Bits:	1 or 2 selectable.
Data logging:	Output in intervals up to 9999 min or by key stroke.

Relay Output:

Function:	High– and Low–flow rate alarms based on the flow rate, mass, corrected volume, or energy.
Form:	Normally open. (SPST)
Max. Voltage	250 V AC
Max. Current	6 A AC

Options:

Analog Outputs:

Function:	Selectable: Output current proportional to standard display or of one RTD input. Setpoints at 4 mA and 20 mA, linear interpolation between.
Output Span:	0 – 20 mA or 4 –20 mA selectable.
Resolution:	12 Bit
Max. Load:	500 Ω internally powered. 800 Ω externally 24 V powered.
Powering:	If there is no external supply >15V the output will be internal powered automatically.

Control of a Sensor–Purge–Unit:

Function:	Two relays control the solenoid activated valves of a Sensor Purge Unit. During the purging time and an additional selectable time after purging, the flow input is maintened.
Time between purging:	10 minutes to 31 days 23 hours 50 minutes.
Purge Duration:	1 to 999 s
Time Constant:	1 to 99 s

4 Basic Formulas

The **DigiFlow 516** includes tables and formulas to calculate the specific gravity $\rho_{(\vartheta,p)}$ and the specific heat capacity $c_{p(\vartheta,p)}$ of the flowing media.

Then the medium heat capacity is calculated as:

$$c_{pm} = \frac{(c_{p(\vartheta_V,p_V)} + c_{p(\vartheta_r,p_r)})}{2}$$

The warmth coefficients develop from this:

$$k_v = \rho_{(\vartheta_V,p_V)} * c_{pm} \text{ und } k_r = \rho_{(\vartheta_r,p_r)} * c_{pm}$$

The (warmth) energy flow is then:

$$Q_E = k_v * (\vartheta_v - \vartheta_r) * \dot{V}.$$

And the done (warmth)work is:

$$W = k_v * \int_{\Delta t} (\vartheta_v - \vartheta_r) * \dot{V} * dt$$

If the warmth media is oil, these characteristic quantities only are in the essential dependent on the temperature. A measuring of the pressure is not necessary.

5 Operation

5.1 Front view

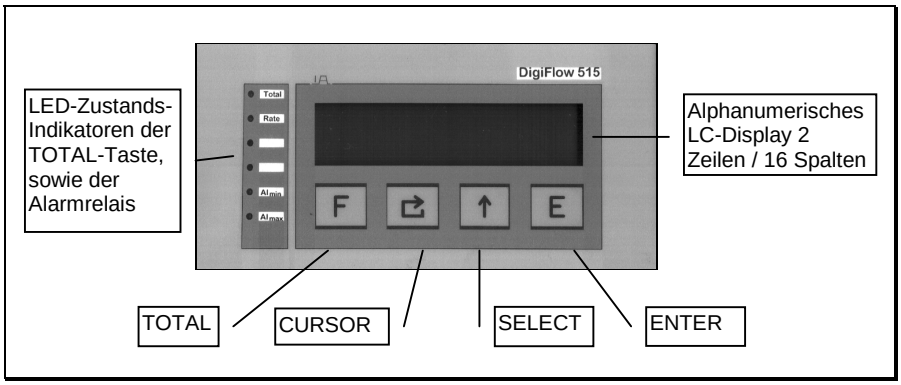


Fig.: 1 Frontview and key description

5.2 General

The **DigiFlow 516** work with a CMOS-microprocessor that processes all measurements and takes all controlling functions.

All operation parameters and rake constants are programmable and stored in a nonvolatile memory which keeps the information after energy loss for at least 40 years,

During normal operation can change the display by pressing the SELECT–key. The following displays can be selected cyclically. (See further information '**Fehler! Verweisquelle konnte nicht gefunden werden.**' page **Fehler! Textmarke nicht definiert.**)

- Toggles between energy and volume (dependant on selected main display)
- Temperatures in up– and downstrem
- k–facrors in up– and downstream
- Time
- Date

The TOTAL–key toggles between the actual flow rates and the accumulated totals and returns to main display level if in higher level.

A higher display level will be exited without any key actuation after about 60 seconds.

If the accumulated flow is displayed, the sum counters can be deleted about the CURSOR-key. This function can be inhibited at the configuration.

5.3 Configuration mode

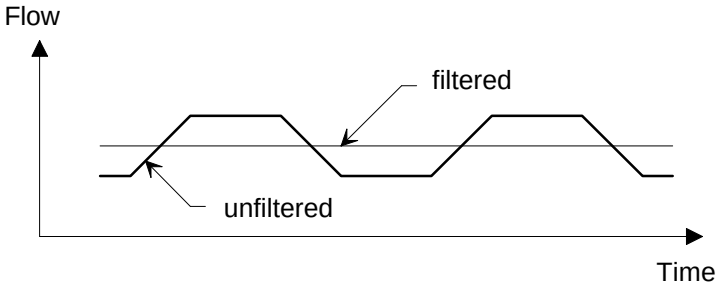
During the Stop mode the configuration and parametrizing mode can be entered by pressing and holding the SELECT–key and then additional pressing the TOTAL–key. 'Herein all for the actual task needed inputs are made. In this mode the keys gets another function. Rolling through the menu items is done by pressing the SELECT–key. The STOP–key selects the actual menu item. When entering a numeric value the RUN–key rolls through the decimal places which are displayed by blinking cursor. This position can then be set using the SELECT–key to the desired value. Pressing the TOTAL–key presets the actual cipher to '0'. See chapter 6.1.1 page 11ff.

5.4 Damping the input signal

Reading the instantaneous measuring correctly often is impossible because of the frequency fluctuations or output current fluctuations of the flow measuring instrument created by the pulsating flow.

Therefore the flow calculator is provided with a digital filter which average out these fluctuations of the flow signal and facilitates through this a more precisely reading of the measured values.

The following diagram shows an input signal pulsating and the effect of the filter on this signal.



As guideline to the degree of filtering to be used, the following table shows the response to a step change in input.

The value AF is the entered filter constant.

The times, after the value reported on the display 90 or 99% of the at the ending worth reaches, is indicated in seconds. For the value AF = 1 therefor no filtering is executed.

F	**90%**	**99%**
1	0	0
2	1	2
4	2	4
6	3	6
10	5	11
15	8	17
20	11	22
25	14	28
35	20	40
45	25	51
60	34	69
75	43	86
90	52	103
99	57	113

Table 1: Response time in seconds on a volatile modification of the input signal

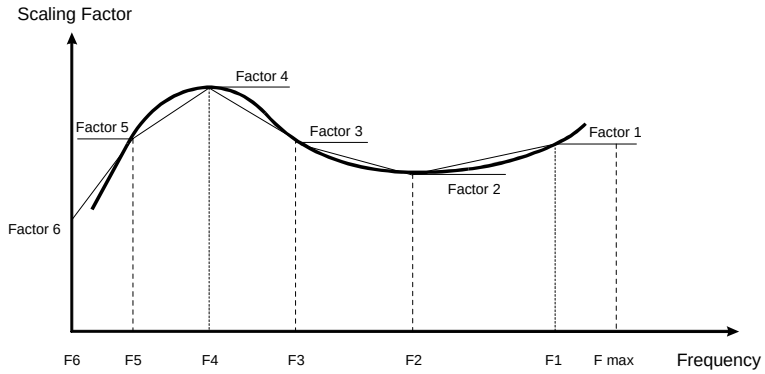
5.5 Nonlinearity Correction

5.5.1 Linearisation of Frequency Inputs

Known nonlinearities of a flow measuring instrument can be corrected.

12 frequencies and scale factors are available to this. Data on the flowmeter non-linearity can usually be supplied by the flowmeter manufacturer in the form of a Calibration Certificate, and is the result of individual tests on flowmeter over a range of flow rates. The certificate will list a number of flow rates or frequencies with the measured k-factor at each flowrate.

The following diagram shows an example for the different scaling factors at various frequencies of an arbitrary flow measuring instrument. The broad black turn stands for the current scaling factor of the set, and the narrow line is for the approximation in the flow calculator.



The curve between the single dots was won by linear interpolation, except for factor 1 which maintains a constant value between Frequency 1 and the maximum input frequency.

During Calibration, the user have to enter a frequency and the corresponding k-factor for each of maximum 12 points.

If a frequency with 0Hz is entered, the program doesn't expect any further correction data. If all 12 correction points are used, the 12th frequency is set on 0Hz automatically.

5.5.2 Linearization For Analog Inputs

Is only one flow signal to the flow calculator connected, a linearization can be programmed for this to compensate for deviations of flow signal and actual flow. Up to 12 Dots can be entered, between worth be interpolated linearly. The correction is done at the standardized device signal (0 1) , so that measure begin and measure end are not affected. Programming of corrections points start with ‘1’, if a ‘0’ is entered no further inputs are accepted.

The flow correction is defined as:

$$Q = span \cdot A_C$$

Note:
The square root relationship for conventional differential pressure flow devices is handled separately and not by the linearity correction described in this section.

6 Software

6.1 Programming and Parameter Setting

6.1.1 Key description

The keys on the front panel of the set have the following functions:

Pict.	Name	Function at normal operation	Function at parameter setting
	TOTAL	Change between sums and instant value display.	Presets at digit input the actual digit to '0'.
	CURSOR	Resets if displayed and allowed the sum counters.	Positions the cursor at number input on position right.
	SELECT	Change between display levels according to description on p.8.	Increase at number input the digit by '1', else next parameter at same level.
	ENTER	Without function.	Take number, resp. jump into selected menulevel.

6.1.2 Configuration of a set

Both the required results entered and the input signal can be subjected to a check with the help of the flow chart to the parameter setting.

By pressing simultaneously the TOTAL– and the SELECT–key the configuration mode is entered. Then the user defined password must be confirmed after input with the ENTER-key. This password is at the new set: '**0000**'.

If moving step by step through the levels, always a description of the actual parameter is shown for clarification.

To leave this configuration mode, the menu must stepped until the item '**Leave**'. Then the ENTER–key must be pressed.

6.1.3 Input of a number

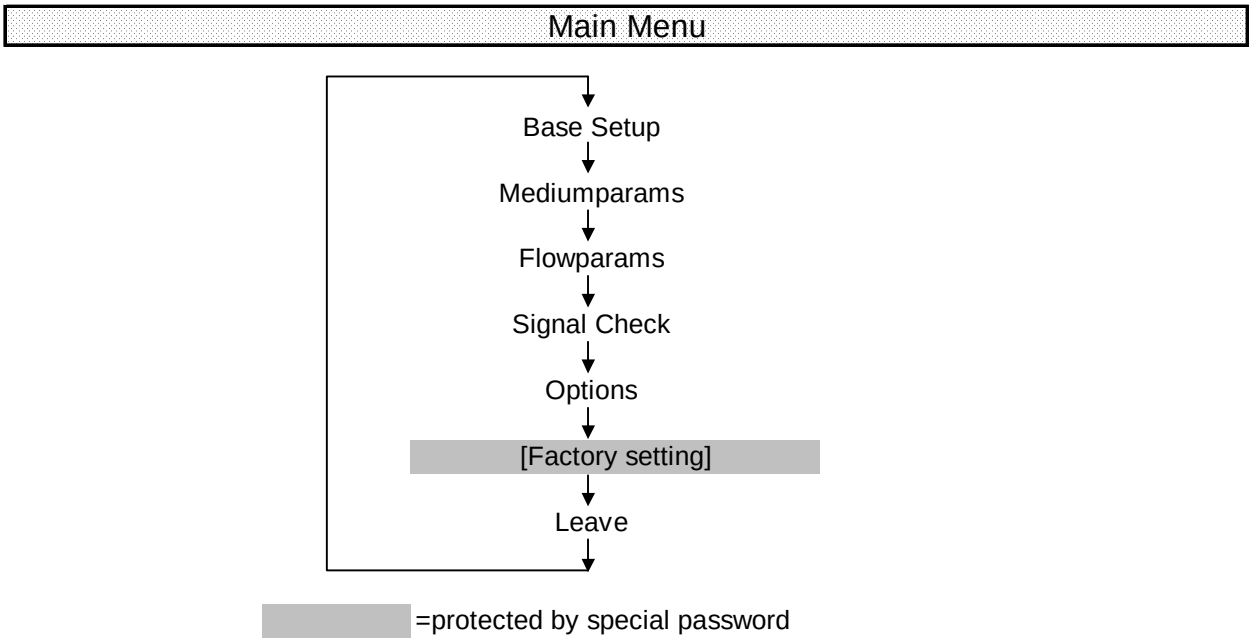
If the input parameter is a number, so the input proceeds as follows.

By means of the CURSOR-key is jumped the desired place. This place then is changed with the help of the SELECT-key. The cursor lies under the sign, this so is changed. The cursor lies under the decimal dot, this so is moved cyclically by actuation of the SELECT-key around a place to the right. Lies the cursor under a number, this can rapidly with the help of the TOTAL-key with the value ` 0 ' be covered.

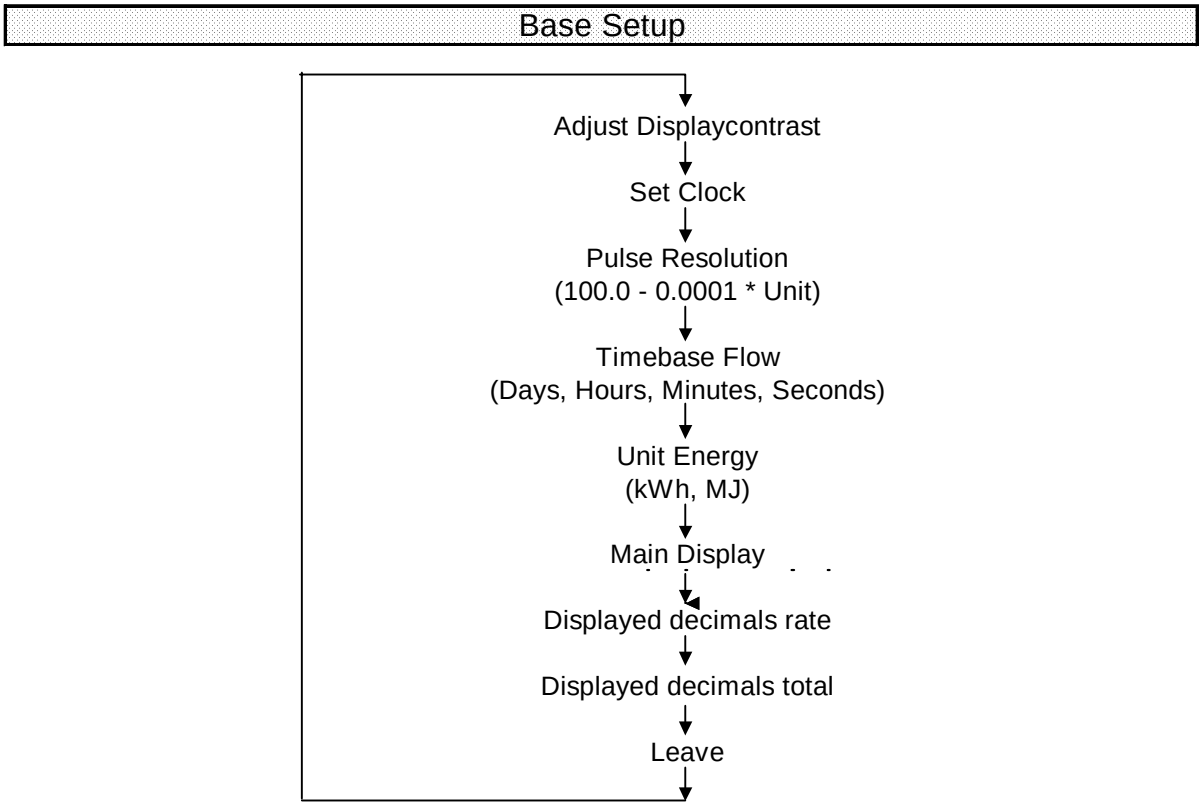
By pressing the ENTER–key, the number input will be finished.

6.2 Menu tables

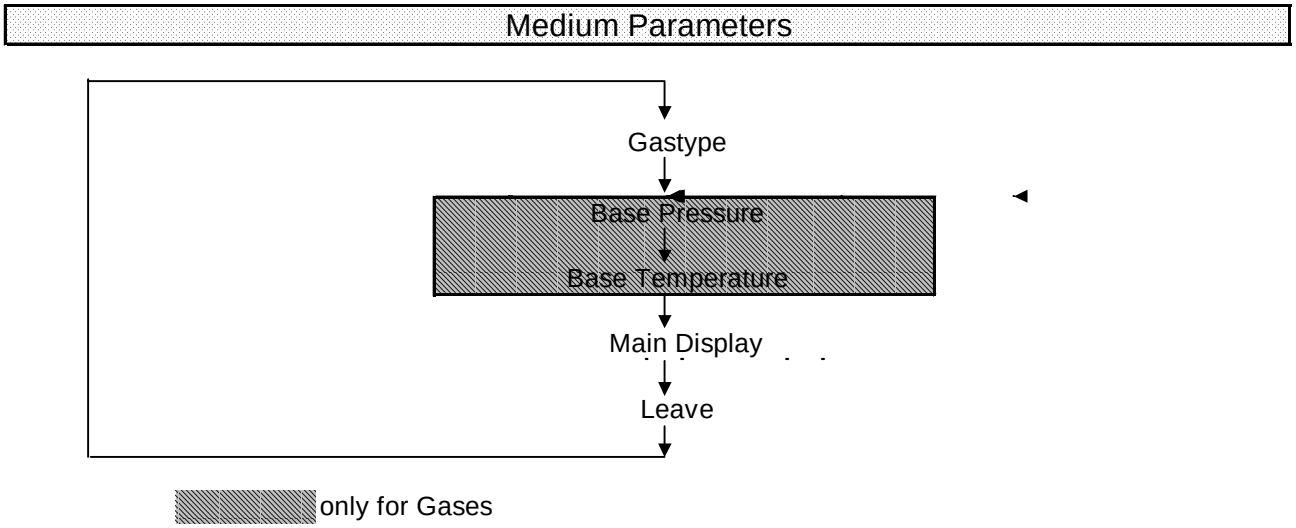
6.2.1 Main Menu



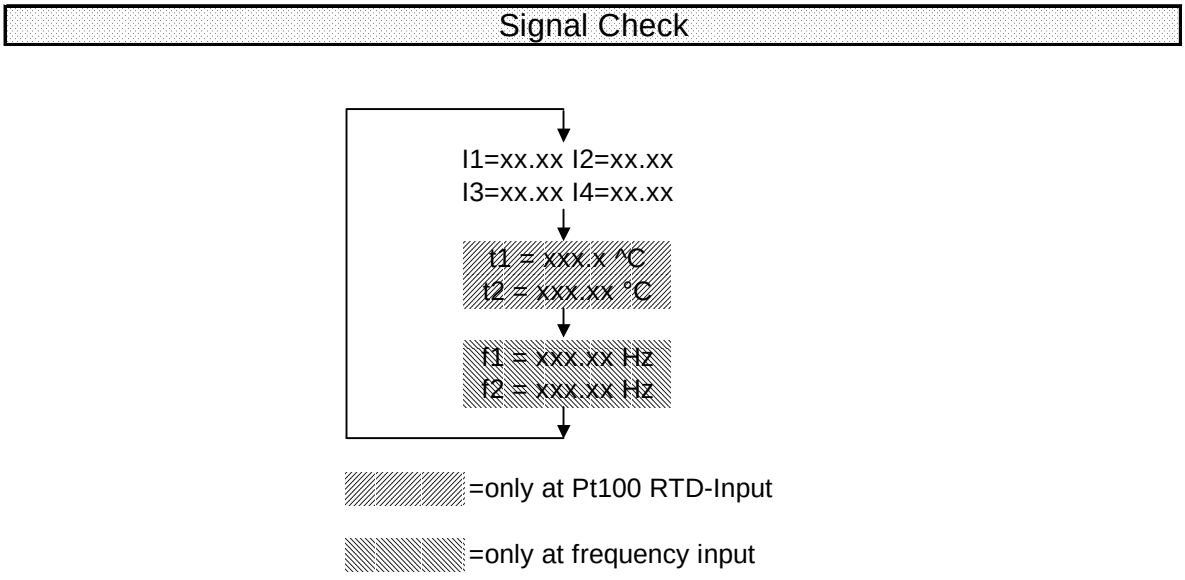
6.2.2 Base Setup



6.2.3 Medium Parameters

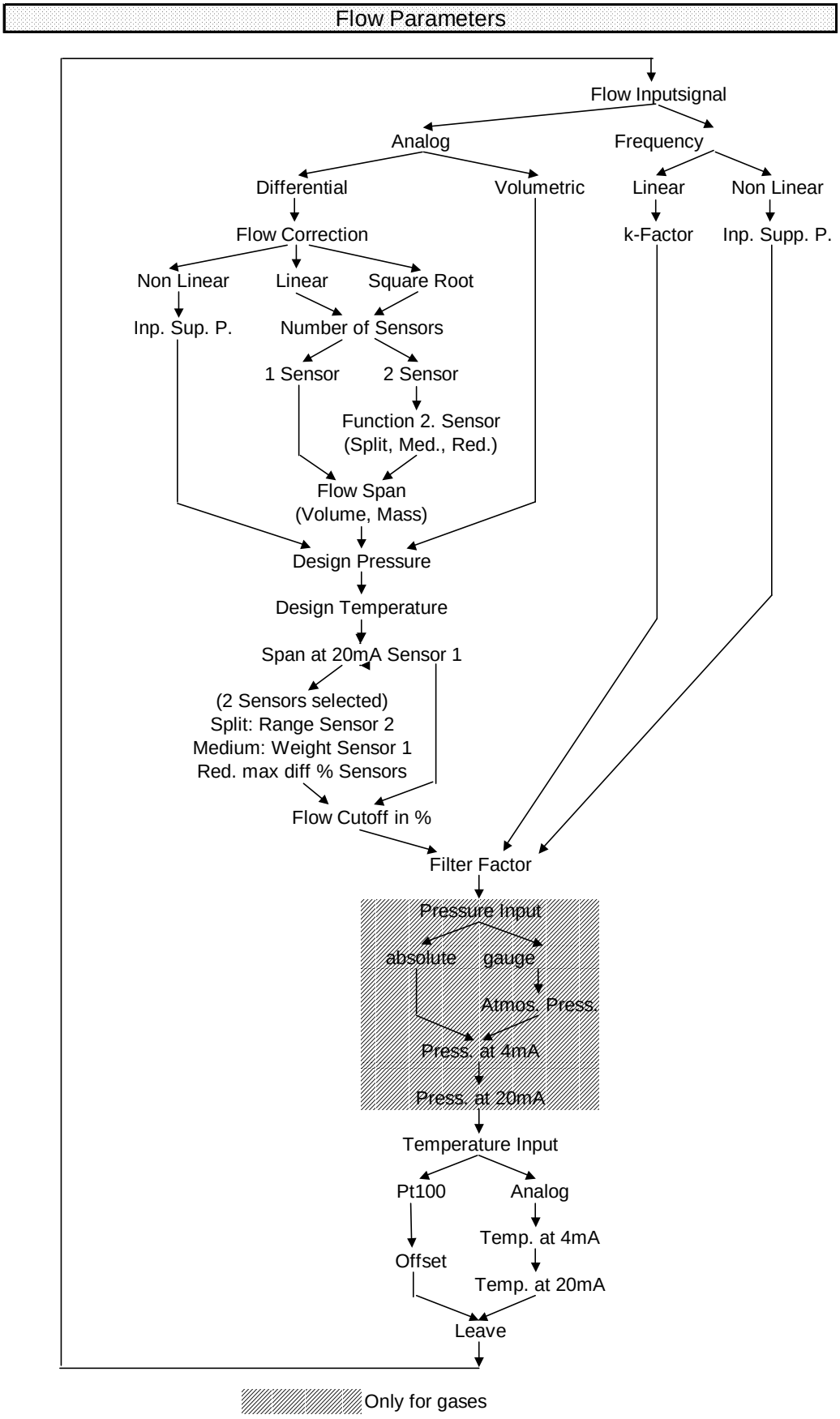


6.2.4 Signal Check

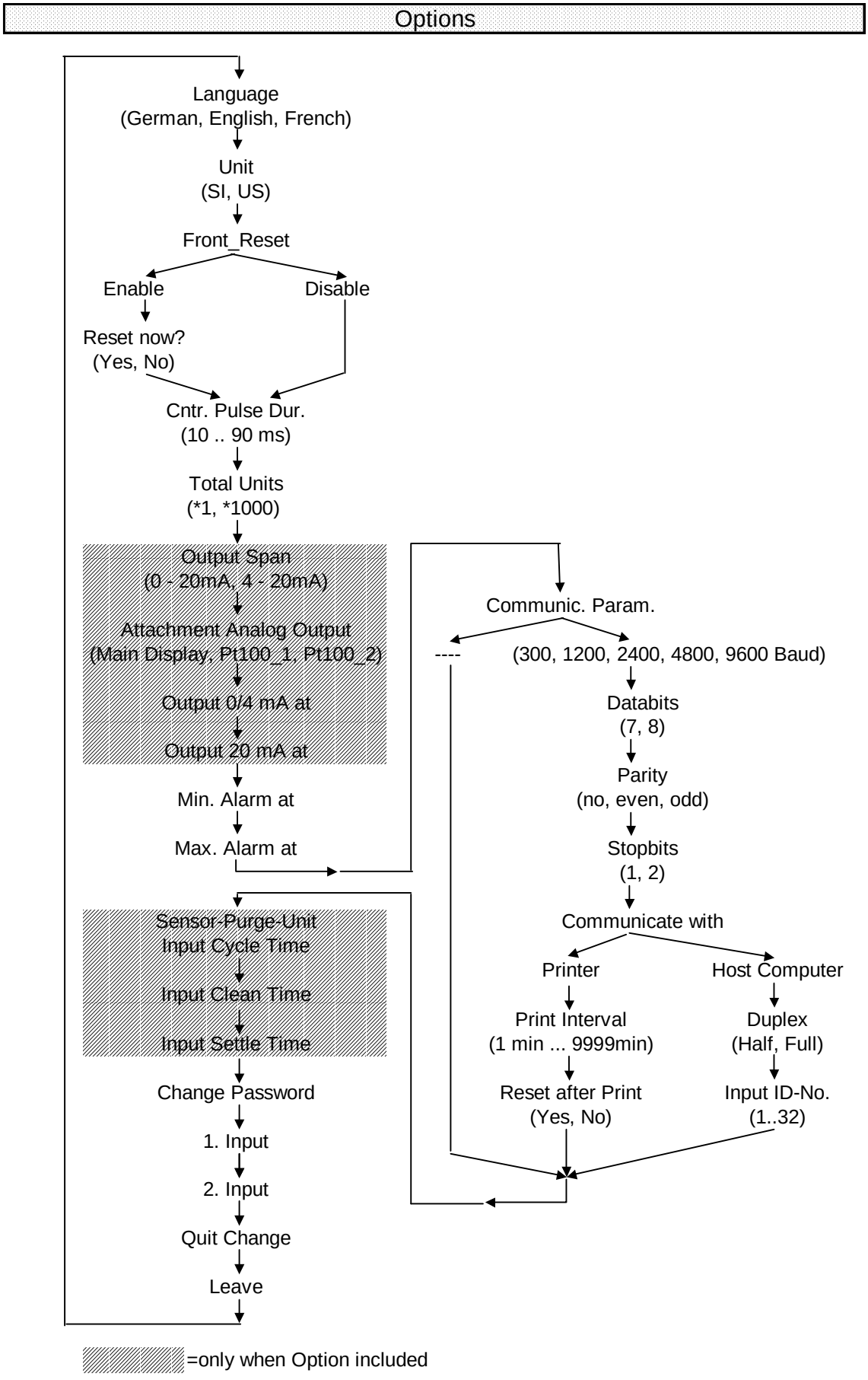


(Remark: This submenu is placed only for set technical reasons in this place. In truth it follows the flow parameter menu).

6.2.5 Flow Parameters



6.2.6 Options


Options
Language
(German, English, French)
Unit
(SI, US)
Front_Reset
Enable
Disable
Reset now?
(Yes, No)
Cntr. Pulse Dur.
(10 .. 90 ms)
Total Units
(*1, *1000)
Output Span
(0 - 20mA, 4 - 20mA)
Attachment Analog Output
(Main Display, Pt100_1, Pt100_2)
Output 0/4 mA at
Output 20 mA at
Min. Alarm at
Max. Alarm at
Sensor-Purge-Unit
Input Cycle Time
Input Clean Time
Input Settle Time
Change Password
1. Input
2. Input
Quit Change
Leave
Communic. Param.

(300, 1200, 2400, 4800, 9600 Baud)
Databits
(7, 8)
Parity
(no, even, odd)
Stopbits
(1, 2)
Communicate with
Printer
Host Computer
Print Interval
(1 min ... 9999min)
Reset after Print
(Yes, No)
Duplex
(Half, Full)
Input ID-No.
(1..32)
=only when Option included

7 Hardware

7.1 Input Circuits

The **DigiFlow 516** has an adjustable supply voltage for transmitters. This voltage can be adjusted in a range of approx. 17.5 -- 19.5V during configuration. A maximum output current of 100mA is allowed.

Of the rear side is a DIP switch accessibly. If the flow signal is a frequency signal, the signal type must here be defined.

If the input signal is an analog signal, the DIP switch doesn't have any function.

7.1.1 Frequency~ / Pulse Input

The DigiFlow 516 has an input signal-conditioning board, which can process most frequency signals of pressure transmitters. By means of the DIP-Switch the correct flow signal will be selected.

The position of the DIP switches is in the following table in dependence of the input signal listed:

Input signal		Terminal		DIP - switch position			
		+	-	1 CH_1	2 CH_1	1 CH_2	2 CH_2
A	active impulse output with large amplitude (12 ... 30 V)	13	17	off	on	off	on
B	passive impulse output (open collector, Reed switch, ...)	13	17	on	on	on	on
C	active impulse output with small amplitude (CMOS, TTL, ...)	13	17	off	off	off	off

The position of the DIP switch #2 is for passive signaling transmitters for channel 1 as same as for channel 2 without meaning.

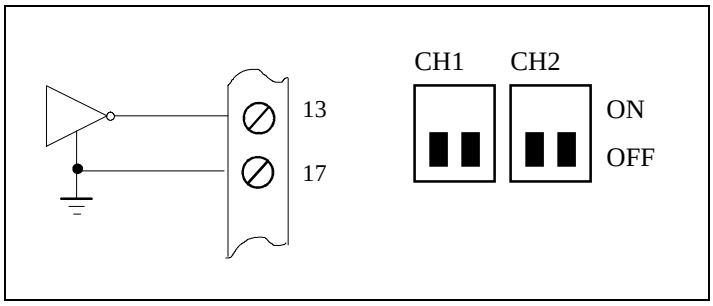
General data:

max. input voltage: $35V_{SS}$

input impedance: A 30kΩ

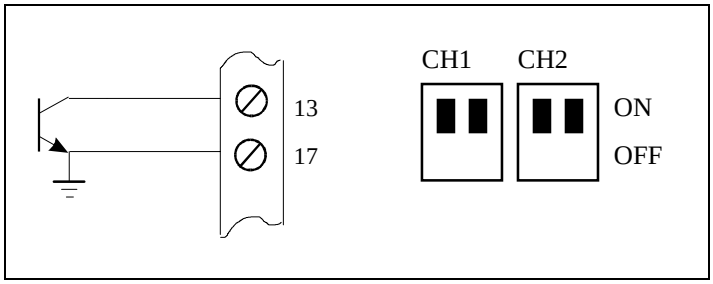
C 10kΩ

7.1.1.1 Examples of Input Types



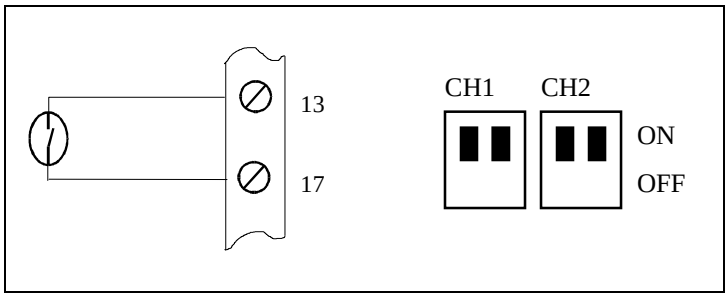
e.g.: VORTEX, pre-amplifier, magnetic inductive flowmeters

Fig.: 2 Input Signal Type 'C' (square wave, CMOS or TTL)



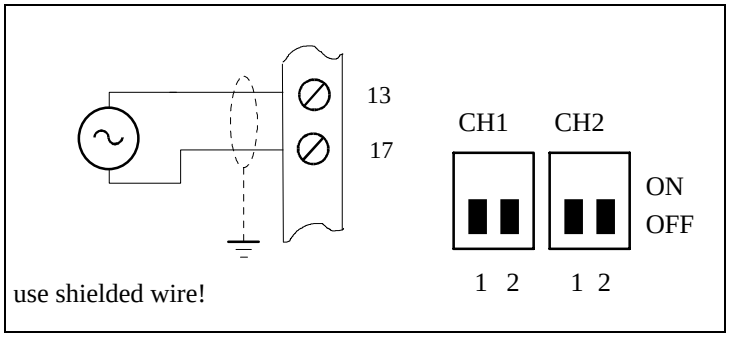
e.g.: Halleffect-sensors, opto couplers

Fig.: 3 Input signal Type 'B' Open Collector



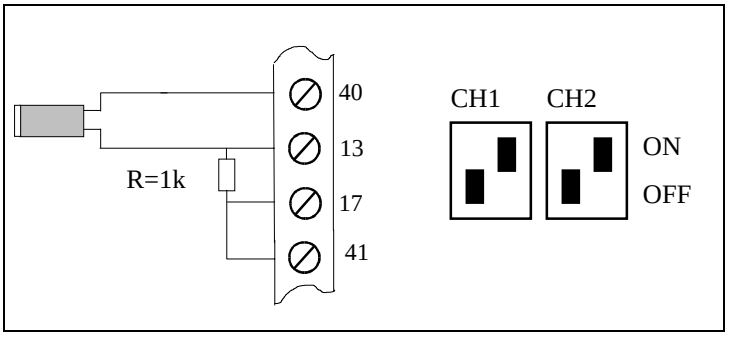
e.g.: Magnetic inductive flowmeters with reed-contact outputs.

Fig.: 4 Input signal Type 'B' (reed-contact)



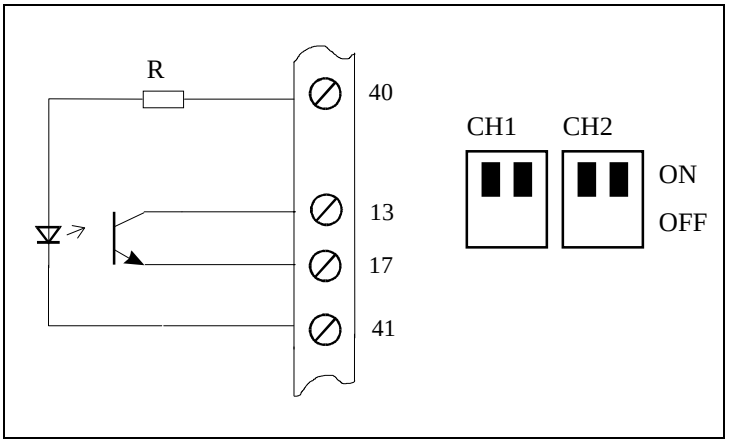
e.g.: mV signal from turbine-flowmeter

Fig.: 5 Input signal Type 'C' coil or tacho generator



e.g.: PDF with proximity switch

Fig.: 6 Input signal Type 'A' NAMUR-proximity switch



E.g.: Opto-sensors, pre-amplifiers

Fig.: 7 Input signal Type 'B' opto-sensor

7.1.2 Analog Input

Each 4-20mA input has a load of 120Ω. When the computer is AC powered, there is sufficient current from DC supply output to power up to 4 transmitters. If more loops are to be powered, an external supply source is required.

Transmitters can be powered intern or extern. Like shown at Fig.: 8 to Fig.: 11. At Fig.: 9 and Fig.: 11 2 differential pressure transmitters are connected to the set. Is only 1 transmitter used, it's signal will be connected to terminal 1 and 2.

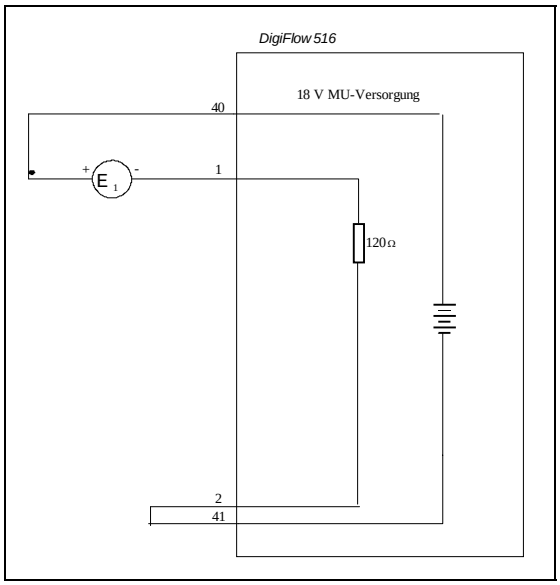


Fig.: 8 Internal supply of one Transmitter

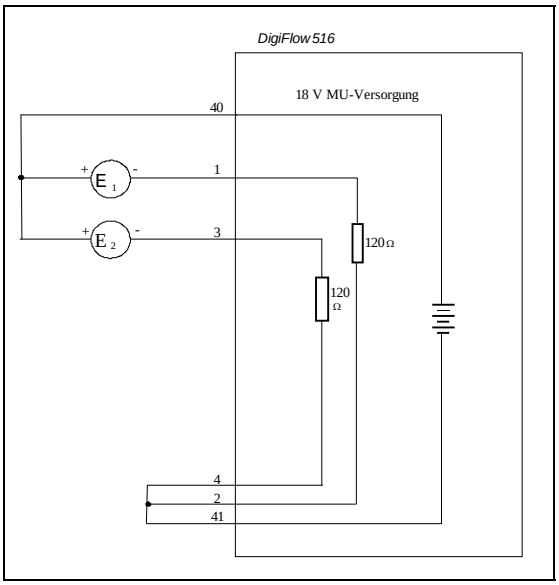


Fig.: 9 Internal supply of two transmitters

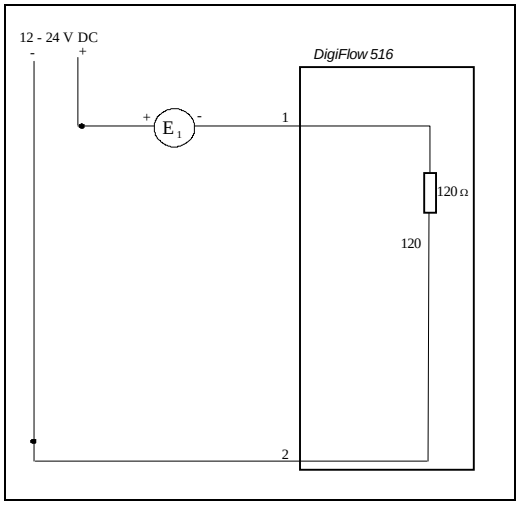


Fig.: 10 External supply of one transmitter

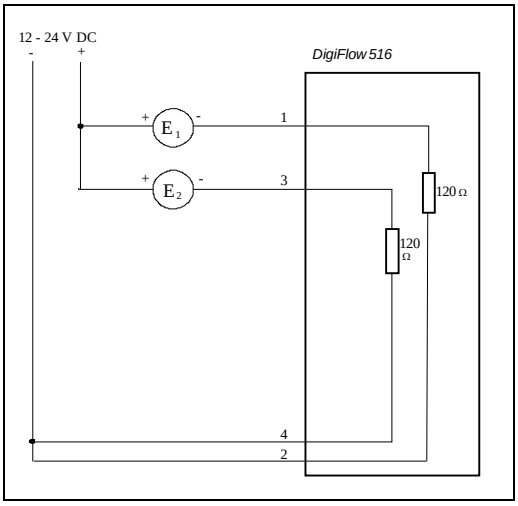


Fig.: 11 External supply of two transmitters

Shielding:: If used shielded signal cables, take care of grounding the shield only at one end. Prefer the DigiFlow end.

7.1.3 Input of Pt100 RTD

A possibility to measure temperature very exactly offers the four wire Pt100 RTD measurement. (use shielded wire).

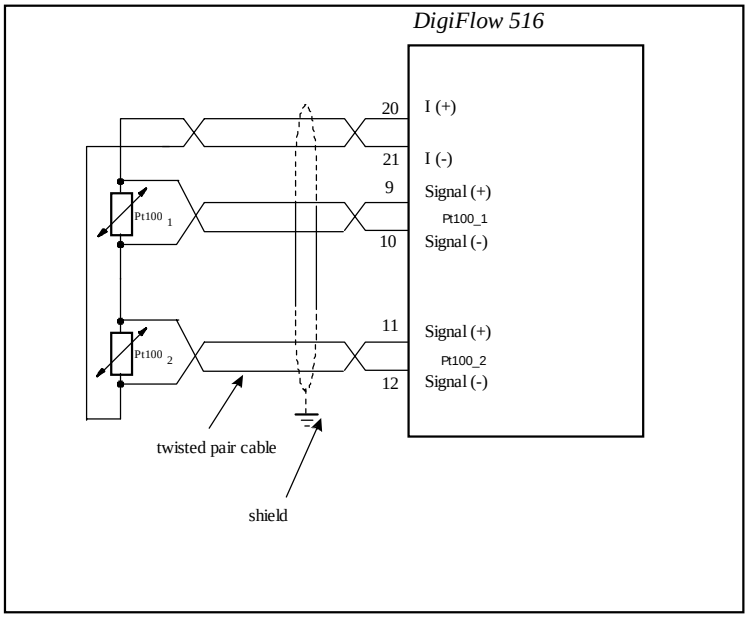


Fig. 1: Connection of the Pt100 RTD

Care must be take that the positive pole of current source connected to positive pole of the signal wires. PTD himselfs has no polarity.

7.1.4 Remote switched functions

The ***DigiFlow 516*** has the ability to reset the sums and to switch the display, by remote keys.

The connection of that keys are displayed in Fig. 2.

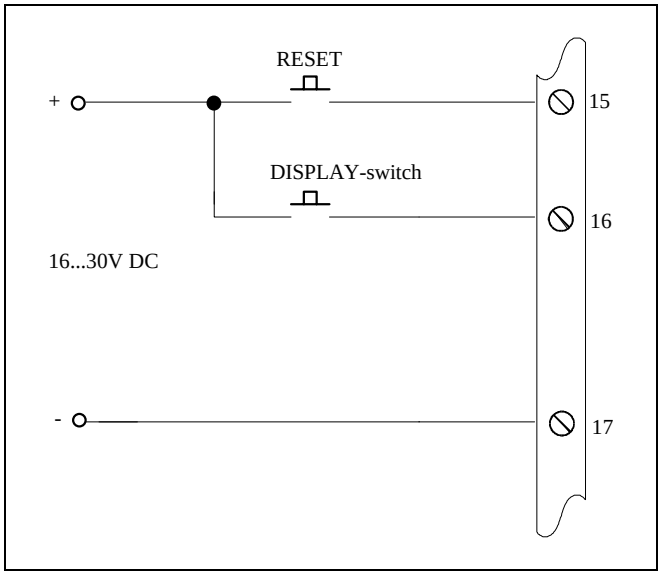


Fig. 2: Connection of external keys

7.2 Output Circuits

7.2.1 Digital Pulse Output

A digital pulse can be taken from the terminal strip at the back for controlling external meters. At every increase of the accumulated counter of a selected powers of ten, output pulses determined by this increase are generated. If the resolution is selected to be 100.000, then on every increase of the internal counter of 100.000 a pulse is set.

This digital pulse is generated at a NPN-Transistor with open collector output. Pulse width is 10 - 90 ms (selectable). Maximum sink current is 100mA.

When connecting a counter to the pulse output, it may be necessary to use an external pull-up-resistor. A resistance of 5 to 10kΩ connected to terminal 40, are most times sufficient.

Make sure that this output isn't usually suitable for a further flow indicator as input signal because of the not periodical pulse signal, please

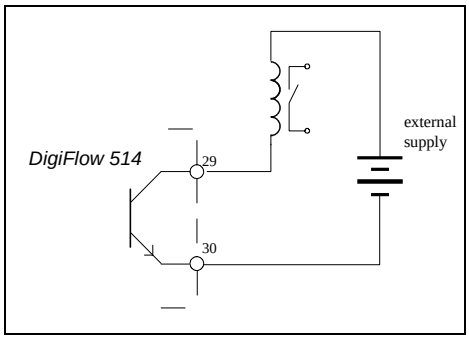


Fig.: 12 Control of external relay or pulse counter

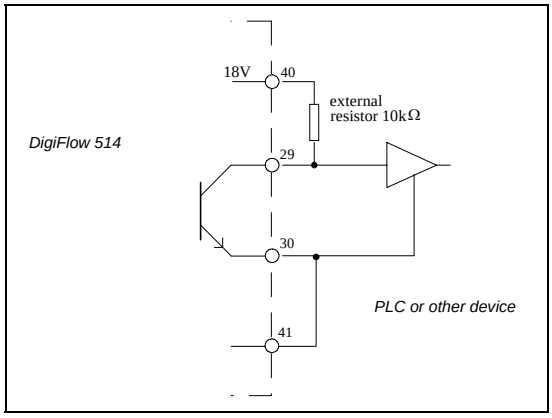


Fig.: 13 Control of logic input like PLC or electronic counter

7.2.2 Relay output

The calculator is equipped with two relays (SPST) per default. These are preset during configuration to energisw when the default flowrate exceeds ($Alarm_{max}$) or drops below ($Alarm_{min}$) the preset value. It has to be taken into account, that the oriented alarm worth lie within the valid measuring range.

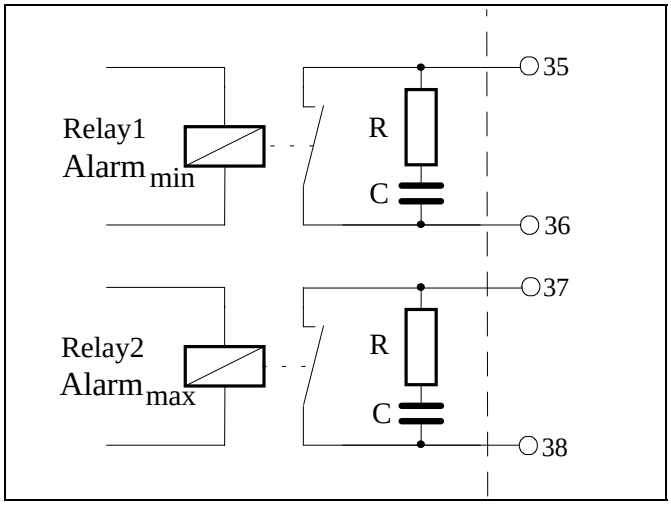


Fig. 3: Circuit diagram relay output

7.2.3 RS232 or RS485-Interface

Either a serial RS 232 interface or a RS 485 interface with galvanic isolation is provided. The interface can be used for data transmission with peripheral equipments or other computers. A standard ticket form is in the flow computer integrated.

7.2.3.1 Circuits

The following drawings gives an overview of the interface wiring. The connection is done for both types via the terminal strip at the rear side.

The RS 232 interface is mostly used for the communications with printers or for point to point connections over short distances.

on the other hand the RS 485 interface is used mainly for communications on large distances (to 1.2km) or for multipoint connections.

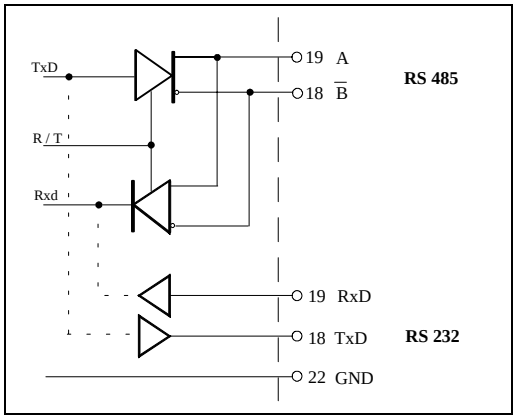


Fig.: 14 Circuit communication interface

7.2.3.2 Communication protocol

The ***DigiFlow 516*** has a build in real time clock. This enables to print out date and time on the ticket. Please regard, that the clock keeps running for about 10 days after disconnecting the power from the unit. After this time the clock need to be set.

The used transmission parameters like baudrate, parity... are software settings and done during configuration. To achieve a communication user must be care that the settings of the printer or PC and ***DigiFlow 516*** correspondents.

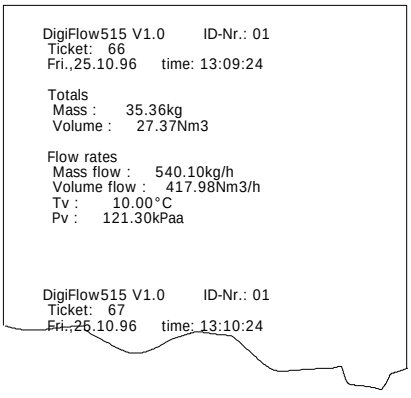
A communication is done after ending a batch process or on request from Host-PC. In the first case output is fixed like description next chapter. In the other case, when communication with a Host PC is taken, only short ASCII-strings are generated.

7.2.3.3 Printers Protocol

A ticket can alternatively be created after actuation of the RESET–key, or after defined intervals (see key lock). At interval wise expression a reset of the sum counters can simultaneously be done.

If the RESET operation is triggered, first the ticket is created and after this the total values are reset internally.

The communications with printers take place without handshake lines. At this is presupposed that the printer buffer correspondingly is large enough and cannot (also at print intervals) overflow. A ticket looks as follows:



7.2.3.4 Host–Communication

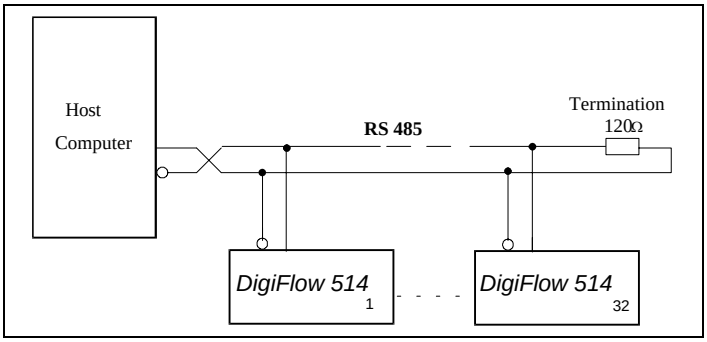
To communicate via a host computer, the following commands are implemented::

ID	When unit active, answer with ID-Code.
IDXX	Activate Unit XX.
S?	Request totals.
R?	Request rates.

T?	Request temperature inputs.
P?	Request pressure inputs.
SR	Reset totals

7.2.3.5 Network Communication

For network communications several sets are connected with a twisted pair cable and mentioned about addresses. Up to 32 instruments can be connected to a common bus using the RS485 interface. Every set gets its own address about which it can be mentioned by the control computers, e.g. process control computers or PLC. The Host distributes an address and activates the corresponding set with it. The data interchange is controlled between control computer and instrument about the software protocol.



7.3 Options

7.3.1 Analog output

Thel 0/4-20mA output option provides an analog output of the default flowrate or one of the two RTD direct inputs. The output will be analog to the corrected volume, mass or energy, depending on which parameter is programmed as the default display, or the temperature of a selected RTD input.

All output signal are isolated from power source an signal inputs, to ensure minimum interference an high reliability.

A block diagram of the output circuit is represented followingly, the various methods of connection have to be found on the following sides.

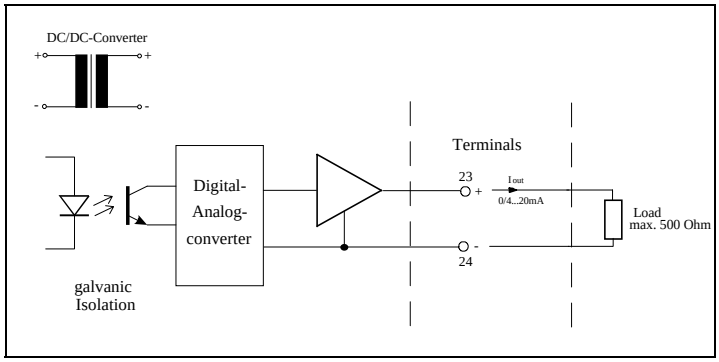


Fig. 4: Analog output circuit

Maximum load in output loop will be 500Ω.

The parameters for the analogous exit are programmed at the configuration of the computer and serve:

Definition of corresponding min. value to 4 or 0mA output

Definition of corresponding max. value to 20mA output

Selection of output span 0–20mA –– 4–20mA

Since the output range can be chosen freely, the computer can be used also for the amplification of the input signal e.g.. At the use of a writer can so instead of the illustration of the complete measuring range of e.g. 0-200kg/min be represented a part extended of 100kg/min (corresponds 4mA) to 120kg/min (corresponds 20mA)

For flow rates or displayed values outside the maximum or minimum values, an output signal of 20 or 0/4mA is issued.

The output signal is after approx. 0.8sec in agreement with the display udated. Between these update the output remains constantly.

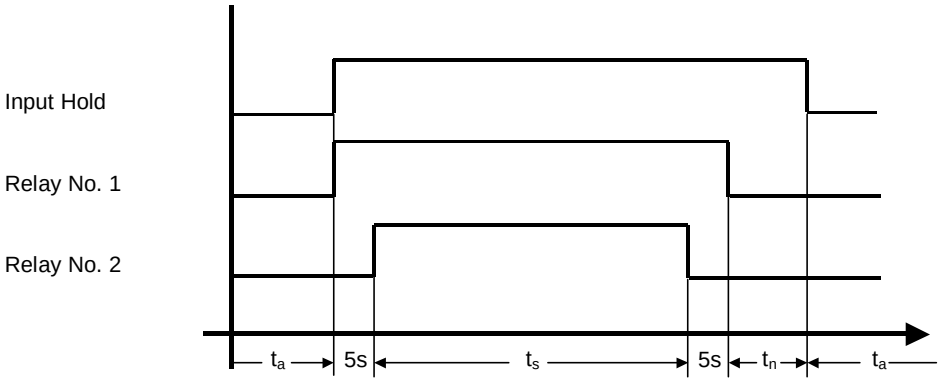
7.3.2 Control of a Sensor–Purge–Unit

The ***DigiFlow 516*** takes about this option the time control of the solenoid valves of a Sensor–Purge–Unit. This serves the freeing of the drillings of the ITABAR-open flow probes, which slowly lean on themselves in a polluted medium, by means of compressed air. Most times the D.P.-transmitter must be uncoupled from sensor before. This happens about solenoid valve blocks. During the flush the transmitter works not and no flow signal therefore is created, the quantity determination wouldn't be correct there. The flow signal therefore is held in the computer during the flush on the last value before the flush. The summation is therefore roughly correct furthermore.

During the parameter setting of the flow computer shall feed in three times.

- 1. Purging time distance $\mathbf{t_a}$: Time between two purgings. Setable from 10min to 31d:23h:50min. This time starts after starting up the calculator or after reconfiguration.
- 2. Purging time $\mathbf{t_s}$: Time of purging the probe. Setable from 1s to 999s.
- 3. Hold on time $\mathbf{t_n}$: Time lasting the measurement held still is although the transmitter is coupled again. This serves, that a stable difference pressure signal can be build up again. Setable from 0s to 99s

7.3.2.1 Time diagram Sensor–Purge–Unit



7.3.2.2 Functional description:

If the time between purging $\mathbf{t_a}$ has passed puts relays #1 on and the measurement of the flow input is held. Relay #2 becomes excited after 5s. Both relays remain excited for the purging time $\mathbf{t_s}$ now. After sequence of operations relay #2 releases and after another 5ses relays #1 also. For the duration of the settle time $\mathbf{t_n}$ however the measurement furthermore is in the calculator held. The current flow signal gets weighted first after this again.

8 Installation

8.1 General

The standard version of the calculating machine is supplied as panel mounting set (144 X 77 mm 5.7" X 3.03"). The cutoff in this panel must be 137mm wide (5.4") and 67 mm (2.6") high. The depth is 130 mm (5.1").The set ist fastened with the supplied mounting clamps.

The feeding of transmitter is carried out via a voltage supply output. This output delivers a voltage of about 18V, which can be set by an parameter at configuration. The maximum output current is 100mA.

The flow computer will be supplied by either 24V DC or 115/230V AC. The built-in mains transformer worries for a complete galvanic isolation between main power and the signal input- and output circles.

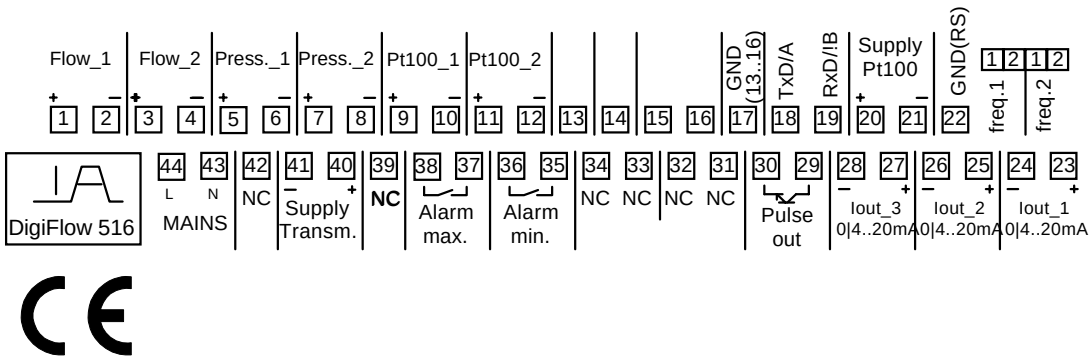
If the transmitter is in larger distance installed by the flow computer, in each case shielded cables should for the inputs and outputs, also in regard on EMC strength be used.

Make sure that the shielding may be grounded only at an end.

suppression filters:

If inductive loads are switched with the relay output, it may be necessary to provide a filtering module under circumstances

8.2 Rear View

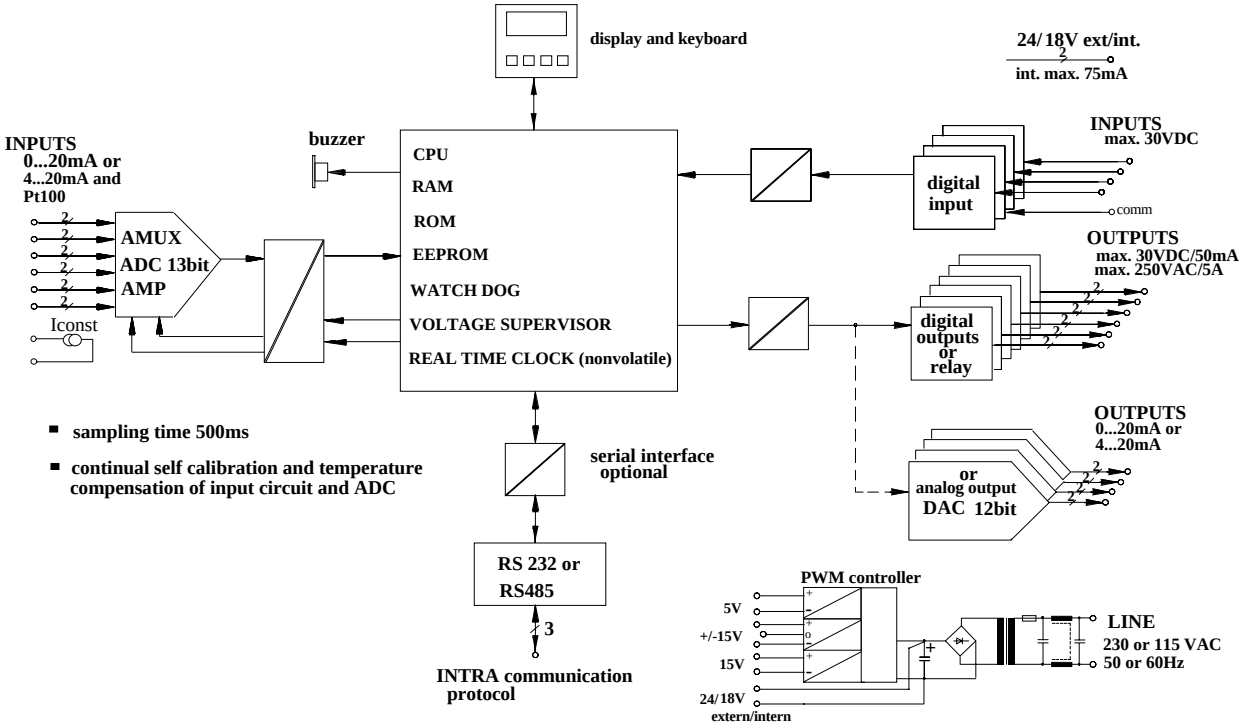


8.3 Wiring Designations

clamp	Function
1	Flow input no. 1 positive pole
2	Flow input no. 1 negative pole
3	Flow input no. 2 positive pole
4	Flow input no. 2 negative pole
5	Pressure input no. 1 positive pole
6	Pressure input no. 1 negative pole
7	Temperature input/Pressure input no. 2 positive pole
8	Temperature input/Pressure input no. 2 negative pole

clamp	Function
9	Pt100 no. 1 positive pole
10	Pt100 no. 1 negative pole
11	Pt100 no. 2 positive pole
12	Pt100 no. 2 negative pole
13	Frequency input no. 1 positive pole
14	Frequency input no. 2 positive pole
15	External sums reset, positive pole
16	External display switchover, positive pole
17	GND for clamps 13 - 16
18	RS 232 TxD / RS 485 B
19	RS 232 RxD / RS 486 A
20	Feeding of Pt100 positive pole
21	Feeding of Pt100 negative pole
22	GND RS 232 / RS 485
23	Analog output no. 1, positive pole (option)
24	Analog output no. 1, negative pole (option)
25	Analog output no. 2, positive pole (option)
26	Analog output no. 2, negative pole (option)
27	Analog output no. 3, positive pole (option)
28	Analog output no. 3, negative pole (option)
29	Pulse output (PNP, collector)
30	Pulse output (PNP-emitter)
31	Relays flush no. 2 (option)
32	Relays flush no. 2 (option)
33	Relays flush no. 1 (option)
34	Relays flush no. 1 (option)
35	Relays alarm minimum
36	Relays alarm minimum
37	Relays alarm maximum
38	Relays alarm maximum
39	NC
40	Transmitter feed+18V, positive pole
41	Transmitter feed +18V, negative pole
42	NC
43	Mains N / (optional 24V negative pole)
44	Mains L / (optional 24V positive pole)

9 Block Diagram



10 Appendix A Error descriptions

In case of errors the display of the **DigiFlow 516** toggles between normal display and error display in Frequency of 1 s. The beeper sounds alternately.

The beeper can be stopped by pressing the ENTER-key during on change to error display. The beeper is then quiet until a new error condition occures.

All errors are not stored and releases when the error conditions ends.

The meaning of these errors are:

Analog #1	I_{in} < 3.6mA or I_{in} > 22mA.
Analog #2	Same as Analog #1, but only when this input is used..
Analog #3	Same as Analog #1, but only when this input is used.
Analog #4	Same as Analog #1, but only when this input is used.
Pt100 #1	R_{pt100} < 20 Ohms or R_{pt100} > 390 Ohms, but only when input is used.
Pt100 #2	Same as Pt100 #1