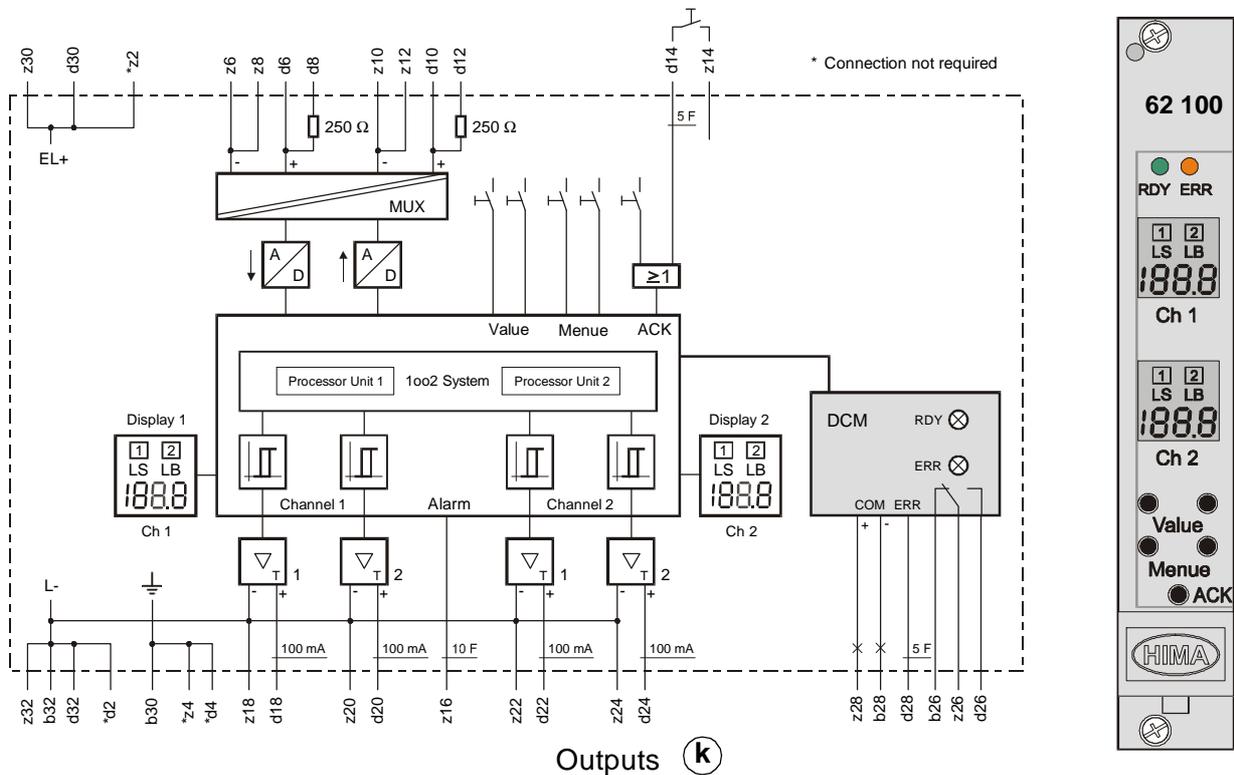TÜV PRODUCT SERVICE   CE

62 100

2-fold analogue Limit Monitor 62 100
safety-related
Input 0...22 mA / 0...5.5 V without line diagnosis
or 4...22 mA / 1...5.5 V with line diagnosis
2 outputs 100 mA each with parameterizable line diagnosis
The module is TÜV tested according to DIN V 19250 for RC 1...6 and
according to IEC 61508 for SIL 3.

Outputs (k)

Analog section

Input voltage	0...5.5 V
Input current	0...22 mA (250 Ω Shunt)
Measuring range	according to NE 43 (I > 3.6 mA, I < 21 mA)
Input resistance	≥ 100 kΩ
Basis error	≤ 0.25 % of upper value (+25 °C)
Operating error	≤ 0.4 % of upper value at -25...+70 °C
Resolution	12 Bit (upp. value incl. overflow)
Filter constant	10 ms

Digital section

Switching time	< 250 ms
Output:	
Current limit	0.11 A ± 10 %
Int. voltage drop	2.5 V at max. load
Min. load	12 kΩ (no lamp load)
Max. inductivity	1 H
Safety time	250 ms
Operating data	24 V DC / 170 mA, plus load
Space requirement	3 U high, 4 SU

The safety-related limit monitor 62 100 for analogue circuits is a 4 spacing units wide module suitable for a 19-inches subrack, 3 units high. The module is equipped with a double processor system. It has two voltage inputs 0...5.5 V electrically isolated from the outputs. The limit value outputs are switched when reaching the adjustable limit plus hysteresis values. If the input voltage leaves the admissible standard range, this is indicated optionally by the common 'Alarm' signal output or by an error signal and switching-off of the module.

In applications together with safety-related transmitters either two limit values can be adjusted for two independent analog circuits. In applications with redundant operating transmitters only two limit values can be adjusted per module. As in practice there are quite often no safety-related transmitters for requirement class 6 available, two transmitters are provided at the same measuring point in this case. Their analog values are compared to differences in the preset values and time. Exceeding the value difference is indicated by the common alarm signal output.

Also the rate-of-change (the gradient) of an analog value can be recorded over an adjustable time basis and allocated to limit values.

The short-circuit proof outputs can be preset with the following parameters: limit value or rate of change (gradient), hysteresis, triggered direction, and optionally line diagnosis (monitoring of the output circuit lines for short-circuit and wire break). The outputs of safety-related limit monitors can be connected in parallel for increasing the availability.

The digitized analog values of both channels are displayed as a percentage value with a resolution of 0.1 % via an LCD on the front panel. The 1-signal of the outputs is indicated by an alighted frame around the corresponding icon. A line break or a short circuit in the output circuits is indicated by flashing icons.

The module is programmed via five pushbuttons and the LCDs on the front panel. An additional device or a PC with a special software program is not required.

For safety reasons it is not possible to change parameters during operation. During operation, however, the set parameters can be selected and displayed using the pushbuttons on the front panel.

Used as a stand-alone system the module can operate without any reducing of the immunity also in a plastic case.
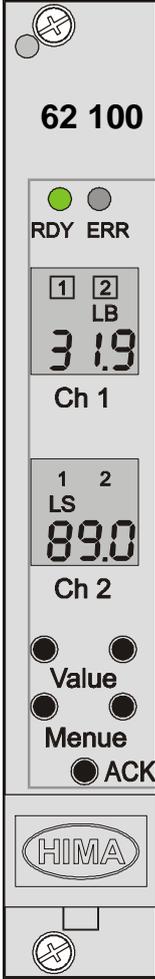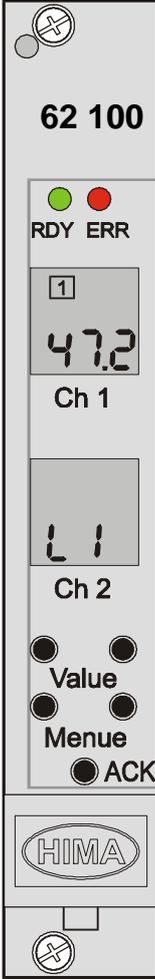
The notes on page 7 of this data sheet for safety-related operation and use as well as the notes in the System Manual of the Planar4 System must be regarded.

A malfunction is indicated by ERR, the output d28 is on 1-signal and the relay contact z26-d26 opens.
The output z28-b28 is provided for the connection to the communication module, e. g. for data transfer to a process control system.

RDY (Ready) indicates the available power supply voltage (≥ 20 V).

Examples of displays

			LED ERR flashing
Output 1: H-Signal			
Current value			Limit value channel 1, output 1
Output 2: H-Signal			
Current value			

Operating Mode: **RUN**   **RUN**   **Parameterization**

LB
Wire break, number of the faulty channel is flashing

LS
Short circuit, number of the faulty channel is flashing

Parameter	Range	Resolution
Limit value 0...20 mA / 0...5 V 4...20 mA / 1...5 V	0.0...110.0 % * 0.0...112.5 % *	0.1 % 0.1 %
Hysteresis Default value 0.5 %	0.5/1...100 %	1 %

*at max. 22 mA / 5.5 V

If the analog input value is outside the standard range (< 3.6 mA / 0.9 V, > 21 mA / 5.25 V according to NE 43), the output z16 (Alarm) is set on 1-signal. Optionally the module can activate the ERR signals (output d28, relay contact, LED) and switch off all the limit value outputs.In the 4...20 mA / 1...5 V operating mode for input values <4 mA / 1 V internally the value 0 % is used for proceeding.

Actuating direction L (Low)
The limit value output is deenergized if the input value is lower than the limit, and is energized again if the input value is higher than the limit plus value of the hysteresis.

Actuating direction H (High)
The limit value output is deenergized if the input value is higher than the limit, and is energized again if the input value is lower than the limit minus value of the hysteresis.

Line diagnosis of the limit value outputs
can be defined, display with current failureThe outputs are safety-related. If safety-related modules are controlled by them, no line monitoring must be defined for the outputs.

Non-safety-related transmitters/sensors for use in safety-related applications
The limit monitor performs also the parallel operation of two non safety-related transmitters/sensors in a 1oo2 voting operation circuit (AND) in safety-related applications up to RC 6 / SIL 3. For all four outputs of the module a limit value can be set and additionally the discrepancies for values and time period can be adjusted.

As limit value the minimum, average or maximum value of both sensors can be selected.

Parameter	Range	Resolution
Limit value	0...100.0 %	0.1 %
Hysteresis Default value 0.5 %	0.5/1...100 %	1 %
Value discrepancy	1.0...90.0 %	0.5 %
Time discrepancy	0.1...199.9 s 1...1999 s	0.1 s 1 s

When exceeding the value discrepancy the output z16 (Alarm) is set to 1-signal during the discrepancy period; after this period all the appertaining limit value outputs are switched off.

Rate-of-change monitoring

The changing of an analog input signal is recorded over an adjustable period. If the parameterized rate of change is exceeded the concerning limit value outputs are switched.Selectable during programming are positive (ascending), negative (descending) and absolute (ascending or descending) gradients.

Parameter	Range	Resolution
Value change 0...20 mA / 0...5 V 4...20 mA / 1...5 V	0.5...110.0 % * 0.5...112.5 % *	0.5 % 0.5 %
Time range (Display rounded off)	0.3; 0.5; 0.8; 1.0; 1.3; 1.5; ... 10 s	ca. 0.25 s

*at max. 22 mA / 5.5 V

The entire time range of all parameterized gradients must not exceed 20 s.

If the rate-of change is not recordable (e. g. due to an out-of-range signal), the output $z16$ (Alarm) is set on 1-signal.

Not used functions

- Not used channels can be inactivated during parameterization.
- Not used limit value outputs with programmed line diagnosis must be loaded with the minimum load of 12 kΩ.

Displays during operation

Operating mode	7 Segment 0...109.9 %	LED RDY	LED ERR	Icon 1, 2	Frame round Icon 1, 2	Display LB	Display LS	Relay
L-Signal at 1, 2	Value	ON	OFF	ON	OFF	OFF	OFF	ON
H-Signal at 1, 2	Value	ON	OFF	ON	ON	OFF	OFF	ON
I_E < 3.6 mA (0.9 V) *	Value	ON	OFF ON [x]	ON	OFF	ON	OFF	ON [x] OFF
I_E > 21 mA (5.25 V) *	Value	ON	OFF ON [x]	ON	OFF	OFF	ON	ON [x] OFF
LB	Value	ON	ON	flashing	OFF	ON	OFF	OFF
LS	Value	ON	ON	flashing	OFF	OFF	ON	OFF
Fault internally	ERR	OFF	ON	OFF	OFF	OFF	OFF	OFF
Fault analogue	ERR	OFF	ON	OFF	OFF	OFF	OFF	OFF
Fault digitally	Value	OFF	ON	flashing	OFF	OFF	OFF	OFF
Programming	Value	ON	flashing	ON/OFF	ON/OFF	OFF	OFF	OFF

* according to NAMUR NE 43, operation 4...20 mA
[x] depending on programming

Display of „Value":
Range 0...22 mA / 0...5.5 V: 0...110 %
Range 4...22 mA / 1...5.5 V: 0...112.5 %

In the operating mode „Rate-of-change" the value display shows the present input value only but not the gradient.

Display of the parameters during operation
Selection of the parameters like in parameterization mode via left or right pushbutton MENUE. The display is left when

- all values have been displayed and after actuating the right push-button MENUE,
- in the first step of the display the left pushbutton MENUE is actuated,
- for 10 seconds no pushbutton is actuated

Displays	Statement
_ _ _	Channel not in use
⎓0.0	Analogue input value < 3.6 mA / 0.9 V (at 4...20 mA / 1...5 V)
Err 100	Error code 100: both channels have line break or short-circuit
Err 101	Error code 101: both channels have line break or short-circuit
Err 110	Error code 110: difference too large in 1oo2 application
Err 131	Error code 131: parameterized data are not correct
	Other error codes are of no significance to the user

Technical data of the fault indication relay

Contact material	Ag alloy, gold-plated
Switching voltage	$\leq$ 30 V = / AC
	$\geq$ 10 mV
Switching current	$\leq$ 1 A, $\geq$ 10 µA
Switching capacity DC	$\leq$ 30 W, non-inductive
Switching capacity AC	$\leq$ 60 VA, cos φ > 0.7
Bounce time	< 2 ms
Life	
mechanical	> 10^7 switching cycles
electrical	> 10^5 switching cycles
	(with resistive load and
	$\leq$ 0.1 switching cycles/s)

Control of modules of the HIMA Planar4 System
If the limit value outputs are connected to inputs of safety-related modules of the HIMA Planar System then the NC principle should be applied (switching to 0-signal when reaching the limit value) and no line monitoring be defined for the limit value outputs.

Notes to the safety-related operation and use
The outputs z16 (Alarm), d28 (ERR) and the contact of the fault indication relay may not be used for safety-related functions.
In operation the analog inputs of the limit monitor 62100 shall be connected only at

- two electrically isolated signal sources or

- signals sources with a common negative reference potential. A safety-related operation with electrically connected signal sources with different reference potential per channel is not permitted.

Screened cables have to be used for the field input circuits, twisted leads are recommended.

If it is sure that the environment of the transmitter up to the limit monitor is free from interference and the distance is relatively short (e. g. inside a metal cabinet) then the cabling can be performed without screened cables or twisted leads.
The immunity of the analog inputs, however, can only be achieved by using screened cables.

Recommendations for the use of the limit monitor according to IEC 61508, SIL 3

- Lines for power supply shall be separated from the input and output circuits

- The output circuits must be connected with two poles

- Application of a suitable earthing must be regarded

- Measures against power loss, alteration of power supply voltage and low voltage have to be taken in the power supply 24 V DC of the system

- The actuating direction in the dangerous situation has to be defined before commissioning in correspondance with the alteration of the physical unit

- Measures against rising of the temperature are to be taken outside of the limit monitor module, e. g. fans in the cabinet

- Recording events in a logbook for operation

A maintenance of the limit monitor is not required. In case of an error the limit value outputs and the fault indication relay is switched off, the LED ERR on the front plate of the module is switched on, and the output d28 is on 1-signal. For safety reasons a failed limit monitor must be removed or replaced immediately.

Notes
The display is readable only at ambient temperatures higher than -10°C. After switching on the power in operating mode RUN (operation) all display segments are illuminated for approx. 40 seconds during the self tests of the module. In the operating mode PROG (parameterization) the module is ready for operation at once.

Entry of the parameters
The parameters of the two channels can be adjusted after having set at first the mode switch at the upper rim of the PCB into one of the end positions PROG. For this setting the module must be pulled out of the subrack, the mode switch has to be set to PROG (parameterize) and then the module must be plugged in again. Then it is at once in the first parameterization step (cf. table on the following pages).

During mode PROG mode all the outputs are deenergized and the red LED ERR is flashing.

- The selection of the parameters and the entry of the values is made by striking the MENUE and VALUE pushbuttons on the front plate of the module. The stored or entered parameters can be seen on of the two displays.When striking the right pushbutton MENUE the entered parameters are shown in the sequence according to the following table; with the left pushbutton MENUE they are shown in reverse sequence.With both the pushbuttons VALUE the desired parameters and values are set or changed into both directions.

- **Important:** For confirmation of the correct entry the same parameters must be entered in each step at once again: after the first entry the module switches with the pushbutton MENUE the second entry. The values of the first entry are shown on the upper display, the values of the second entry are shown on the lower display.The next or previous range of parameters can be selected by the pushbuttons MENUE only if the entered value is in the permissible range, and if the first and second entry are identical.

After the last entry and having pressed the pushbutton ACK then for approx. 1 second the display "Oc" is shown and the new parameters are accepted. If the values do not correspond, the display shows E01 or E02, and the values are not accepted. After striking the pushbutton ACK the system returns to the first step of the parameter input.

After parameterization pull out the module again, set the mode switch on the PCB back to the center position RUN and plug in the module into the subrack again.

Table: Sequence of parameterization

	MENUE	VALUE	Statement	Remarks, explanations
1	Channel selection	cH1	Cannel 1 selected	Selection for parameterization
		cH2	Channel 2 selected	
		rEd	1oo2 application	**after step 4 continued with 6**
2	Switching off of channels not in use	On	Selected channel ON	Additional displays:
		OFF	Selected channel OFF	Operating mode OP
				Channel number 1 or 2
3	Input signal	4	4...20 mA / 1...5 V with ERR	ERR: Switch-off of the outputs with input signals out of standard range (NE 43)
		40	4...20 mA / 1...5 V without ERR	
		0	0...20 mA / 0...5 V	
4	Line diagnosis for outputs	OFF	Line diagnosis OFF	Line diagnosis for the limit value outputs
		On	Line diagnosis ON	
5	Signal evaluation	L1	Limit value (**continued with 5.1**)	Display: □ for output 1 (2)
		Gr	Gradient (**continued with 5.2**)	
5.1	Limit value	L1	selected: limit value	Display: □ for output 1 (2)
5.1.1	Actuating direction	L	Actuating direction Low	Limit value underflow
		H	Actuating direction High	Limit value overflow
5.1.2	Setting the limit value	188.8 188.8 188.8 188.8	▨ flashing digit display for value entry	Additional display: L1 Selection of the digit with "Menue", setting of the value with "Value"
5.1.3	Setting the hysteresis	188.8 188.8 188.8 188.8	▨ flashing digit display for value entry	Additional display: HS Selection of the digit with "Menue", setting of the value with "Value"
5.1.4	Steps since 5 repeated for the second output, **then continued with 7**			

	MENUE	VALUE	Statement	Remarks, explanations
5.2	Gradient	6r	selected: gradient	Display: □ for output 1 (2)
5.2.1	Type	P6	positive gradient	ascending values
		n6	negative gradient	descending values
		A6	absolute gradient	ascending or descending values
5.2.2	Setting the value	188.8 / 188.8 / 188.8 / 188.8	▮ flashing digit display for value entry	Additional display: 6dL Selection of the digit with "Menue", setting of the value with "Value"
5.2.3	Setting the time range	08.8 / 08.8 / 08.8	▮ flashing digit display for value entry	Additional display: 6dt Selection of the digit with "Menue", setting of the value with "Value"
5.2.4	Steps since 5 repeated for the second output, **then continued with 7**			

6   **Additional parameterization for 1oo2 application of the sensors**

6.1	Steps 5 to 5.1.3 or 5 to 5.2.3 repeated for each of the four outputs, then:			
6.2	Evaluation of the sensors	A	Average value	
		nA	maximum values	
		n in	minimum values	
6.3	Setting the value discrepancy	188.8 / 188.8 / 188.8 / 188.8	▮ flashing digit display for value entry	Additional display: dL Selection of the digit with "Menue", setting of the value with "Value"
6.4	Selection of time basis	d5	Deci-seconds (0.1 s)	Additional display: dt5
		5	Seconds	
6.5	Setting the time discrepancy	188.8	flashing digit display for value entry, as above	Additional display: dt Entry like other values

|	Entry	Display	Statement	Remarks, explanations
7		Acc	Strike pushbutton ACK	Additional display: $cH1$ or $cH2$ or rEd
7.1	Pushbutton ACK	Acc	Entries stored, display:	Oc (for approx. 1 s)
7.2	Pushbutton ACK	Acc	Entries not stored, display:	$E01$ or $E02$
			E01: Limit value + hysteresis > permissible range	
			E02: Limit value - hysteresis < permissible range	
			Correction of the entries after striking ACK	

1 Operation with a safe transmitter

In this application the first channel is operated with a current input 4...20 mA, the second channel with voltage input 0...5 V.
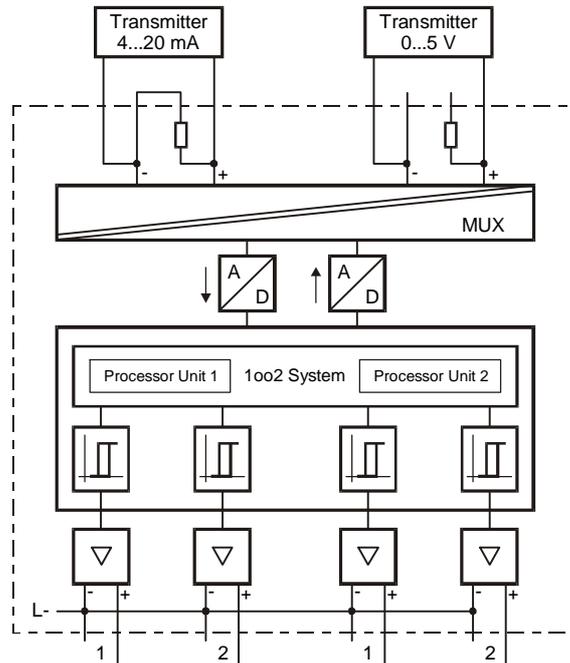
## 2 1oo2 Operation of sensors with monitoring of the discrepancy

As practically very often only non-safety-related transmitters are available, two transmitters have to be assembled at the same measuring point to get the required safety. In this case both of the transmitters are related to the same two outputs. The permissible discrepancies of values and time periods are adjusted. If the minimum, average or maximum value of the two transmitters is lower or higher than the adjusted limit then the related output will be deenergized. Four limit values can be adjusted.

This application can also be used to compare two analog values for a permissible difference.
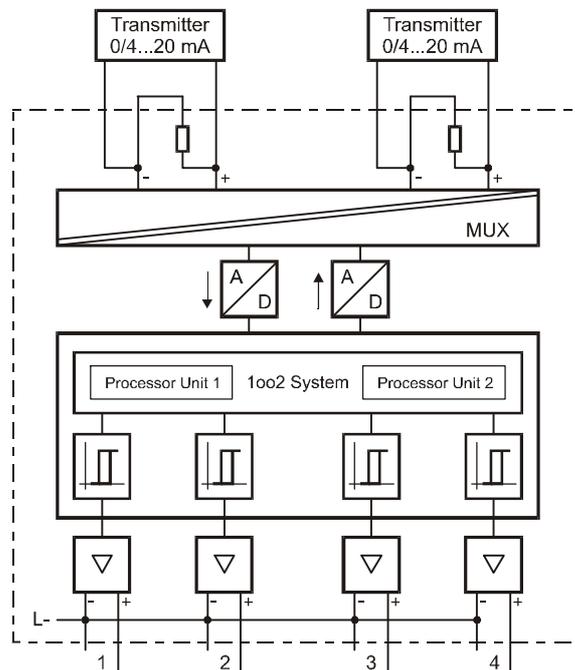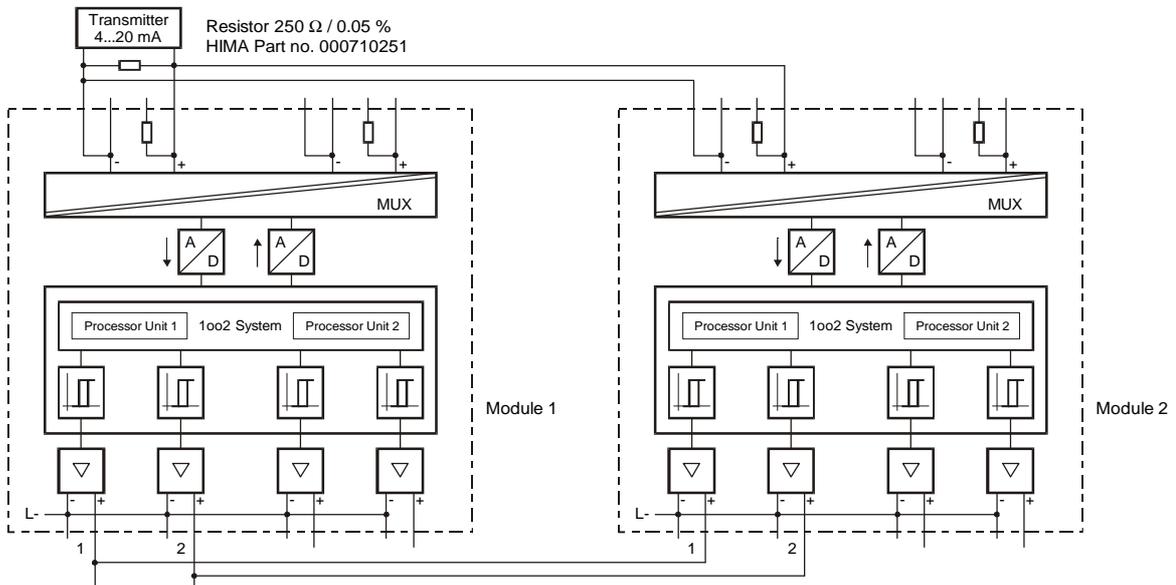
3 Redundant operation, input voltage 0...5 V

The output voltage of one transmitter is connected in parallel on two independent limit monitors 62100. Both of the limit monitors are set to the same limit value, and their outputs are connected in parallel. The failure of one limit monitor does not influence the signal of the logic circuit afterwards. This operating mode does not permit a line monitoring of the output circuits.
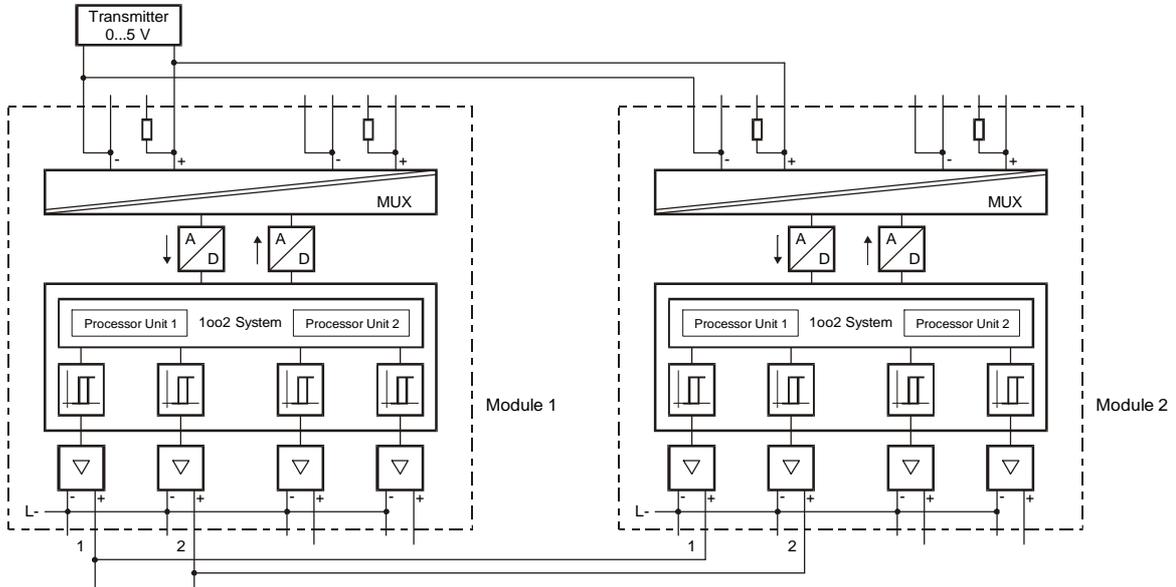
4 Redundant operation, current input 4...20 mA

The current of one transmitter is lead to two independent limit monitors 62100. This application requests an additional resistor outside of the limit monitor. Both of the limit monitors are set to the same limit values, and the outputs are connected in parallel. The failure of one limit monitor does not influence the signal of the logic circuit afterwards. This operating mode does not permit a line monitoring of the output circuits.

5 Redundant operation, open-circuit principle with current input 4..20 mA

The output current of one transmitter is connected in series on two independent limit monitors 62100. This application requires an additional resistor outside of one limit monitor. Both of the limit monitors are set to the same limit values and their outputs are connected in parallel and decoupled by diodes. The line diagnostic of the output circuit is active. The failure of one limit monitor does not influence the signal of the logic circuit afterwards.
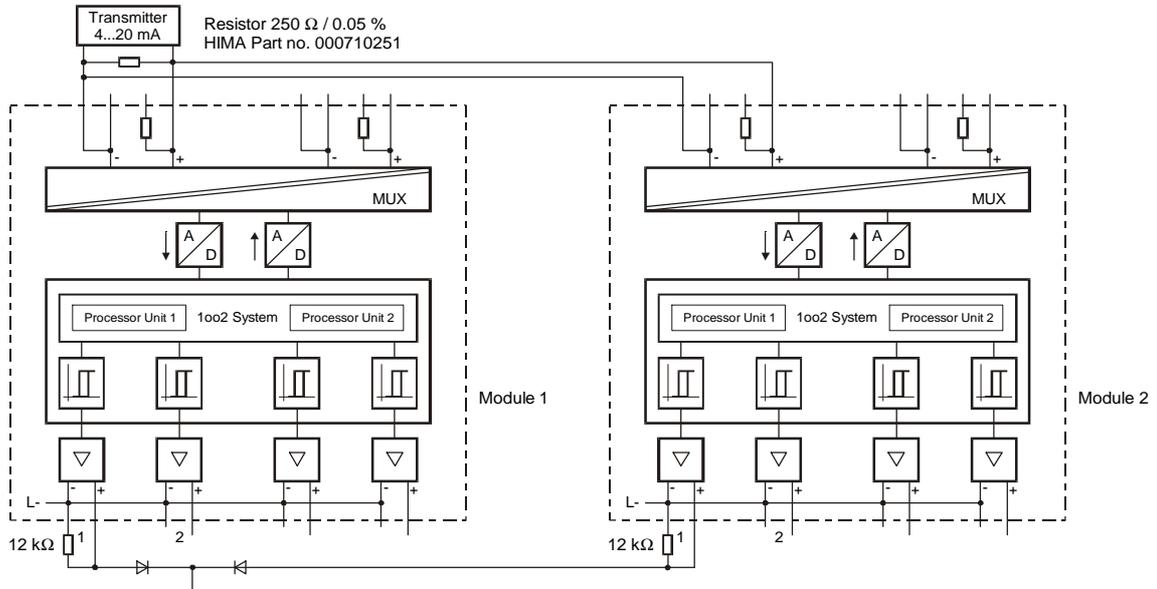
6 Operation mode for more than two limits per transmitter

The current (voltage of channel 1) of one transmitter is connected also on the second channel of the limit monitor.
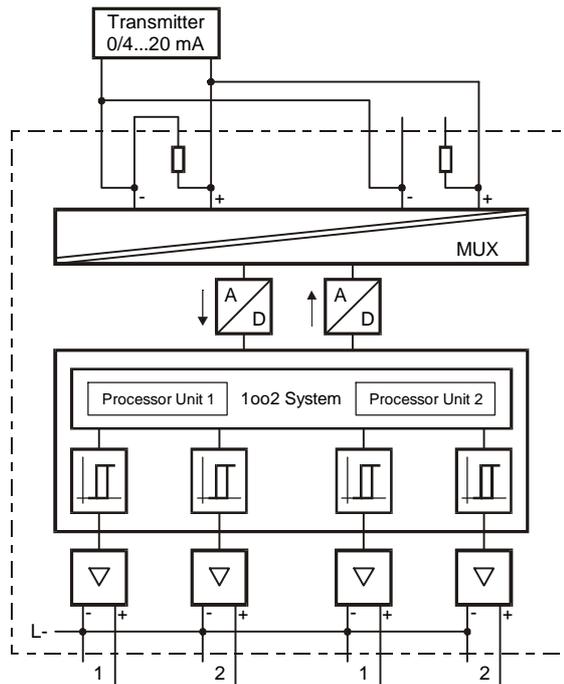
Kommunikation via MODBUS
Reading of variables

Type BOOL: Function code 1
Type WORD: Function code 3
Events: Function codes 65, 66, 67

Rel. address	Data type	Value	Meaning	Rel. event no.
0	WORD	F1 H	Module type 62 100	
1	BOOL	0	none	
2	BOOL	1	Module removed	
3	BOOL	1	Communication with module not o.k.	
4	BOOL	1	Module in slot, communication o.k.	
5	BOOL	1	Operating voltage too low, no RDY	
6	BOOL	1	Module error, ERR	
7...24	BOOL	0	none	
25	WORD	*	Actual value channel 1	
26	WORD	*	Actual value channel 2	
27	BOOL	1	1-signal at output d18, channel 1/1	24
28	BOOL	1	1-signal at output d20, channel 1/2	25
29	BOOL	1	1-signal at output d22, channel 2/1	26
30	BOOL	1	1-signal at output d24, channel 2/2	27
31	BOOL	1	1-signal at output z16, Alarm	28
32...34	BOOL	0	none	
35	WORD	*	Channel 1, limit value 1	
36	WORD	*	Channel 1, limit value 2	
37	WORD	*	Channel 2, limit value 1	
38	WORD	*	Channel 2, limit value 2	

Value: 0 always has the contrary meaning
            H: hexadecimal value
            * Range 0...1125 in steps of 0.1 % (0...112.5 %)
absolute address: $A = p * 256 +$ rel. address
absolute event no.: $E = (p - 1) * 32 +$ rel. event no.
                       p = module location no. in the subrack

Reading of all variables
Function code 3, 84 words
since address 2000 H

	Word 0 (16 bit)		Word 1 (16 bit)	Word 2 (16 bit)	Word 3 (16 bit)	
Rel. address	0	8 1	25	26		34 27
Data	Mod. type	Mod. state	Actual value channel 1	Actual value channel 2	none	outputs

Reading of all variables
Function code 3, 84 words
since address 3000 H

	Word 0 (16 bit)		Word 1 (16 bit)	Word 2 (16 bit)	Word 3 (16 bit)	
Rel. address	0	8 1	35	36		34 27
Data	Mod. type	Mod. state	**Additional information** Channel 1, limit value 1	**Additional information** Channel 1, limit value 2	none	outputs

Reading of all variables
Function code 3, 84 words
since address 4000 H

	Word 0 (16 bit)		Word 1 (16 bit)	Word 2 (16 bit)	Word 3 (16 bit)	
Rel. address	0	8 1	37	38		34 27
Data	Mod. type	Mod. state	**Additional information** Channel 2, limit value 1	**Additional information** Channel 2, limit value 2	none	outputs

Additional information

Bit no. **0 1 2 3**				Channel parameterization
0				Channel not in use
1				Channel in use
	0	0	0	Actuating direction of the limit value: L (Low)
	0	0	1	Actuating direction of the limit value: H (High)
	1	0	0	Rate-of-change monitoring: positive gradient
	1	0	1	Rate-of-change monitoring: negative gradient
	1	1	0	Rate-of-change monitoring: absolute gradient

For a faultless data transfer always all 84 words must be read. With that all the variables of the modules of one subrack are transferred. For module locations not in use the values 0 are transferred.

Communication via Profibus-DP
Reading of variables
Relative addresses type WORD and type BYTE
State of the module, signals at the outputs

WORD	Bit	BYTE	Bit	Value	Meaning
0	0...7	0	0...7	F1 H	Module type 62 100
	8	1	0	0	none
	9		1	1	Module removed
	10		2	1	Communication with module not o.k.
	11		3	1	Module in slot, communication o.k.
	12		4	1	Operating voltage too low, no RDY
	13		5	1	Module error, ERR
	14		6	0	none
	15		7	0	none
1...2		2...5		0	none
3	0	6	0	1	1-signal at output d18, channel 1/1
	1		1	1	1-signal at output d20, channel 1/2
	2		2	1	1-signal at output d22, channel 2/1
	3		3	1	1-signal at output d24, channel 2/2
	4		4	1	1-signal at output z16, Alarm
	5...7		5...7	0	none
	8...15	7	0...7	0	none

Value: 0 always has the contrary meaning
              H: hexadecimal value
absolute address WORD: $W = 4 * (p - 1) +$ rel. address
absolute address BYTE: $B = 8 * (p - 1) +$ rel. address
                                    $p =$ module location no. in the subrack

Communication via Profibus-DP
Reading of variables
Relative addresses type WORD and type BYTE
State of the module, actual values, signals at the outputs

WORD	Bit	BYTE	Bit	Wert	Bedeutung
0	0...7	0	0...7	F1 H	Module type 62 100
	8	1	0	0	none
	9		1	1	Module removed
	10		2	1	Communication with module not o.k.
	11		3	1	Module in slot, communication o.k.
	12		4	1	Operating voltage too low, no RDY
	13		5	1	Module error, ERR
	14		6	0	none
	15		7	0	none
1	8...15	2	0...7	0...127	Actual value channel 1 (high byte) in 0.1 %
	0...7	3	0...7	0...127	Actual value channel 1 (low byte) in 0.1 %
2	8...15	4	0...7	0...127	Actual value channel 2 (high byte) in 0.1 %
	0...7	5	0...7	0...127	Actual value channel 2 (low byte) in 0.1 %
3	0	6	0	1	1-signal at output d18, channel 1/1
	1		1	1	1-signal at output d20, channel 1/2
	2		2	1	1-signal at output d22, channel 2/1
	3		3	1	1-signal at output d24, channel 2/2
	4		4	1	1-signal at output z16, Alarm
	5...7		5...7	0	none
	8...15	7	0...7	0	none

Value: 0 always has the contrary meaning
H: hexadecimal value
absolute address WORD: $W = 84 * (p - 1) + $ rel. address
absolute address BYTE: $B = 168 * (p - 1) + $ rel. address
p = module location no. in the subrack

Communication via Profibus-DP
Reading of variables
Relative addresses type WORD and type BYTE
Limit values, actuating direction, gradient

WORD	Bit	BYTE	Bit	Wert	Bedeutung
0	15	0	7	1	Channel in operation
	14...12		6...4	000	Actuating direction of the limit value: L (Low)
				001	Actuating direction of the limit value: H (High)
				100	Rate-of-change monitoring: positive gradient
				101	Rate-of-change monitoring: negative gradient
				110	Rate-of-change monitoring: absolute gradient
	0...11		0...3	0...15	Limit value channel 1, output 1 (high byte) in 0.1 %
		1	0...7	0...127	Limit value channel 1, output 1 (low byte) in 0.1 %
1	15	2	7	1	Channel in operation
	14...12		6...4	000	Actuating direction of the limit value: L (Low)
				001	Actuating direction of the limit value: H (High)
				100	Rate-of-change monitoring: positive gradient
				101	Rate-of-change monitoring: negative gradient
				110	Rate-of-change monitoring: absolute gradient
	0...11		0...3	0...15	Limit value channel 1, output 2 (high byte) in 0.1 %
		3	0...7	0...127	Limit value channel 1, output 2 (low byte) in 0.1 %
2	15	4	7	1	Channel in operation
	14...12		6...4	000	Actuating direction of the limit value: L (Low)
				001	Actuating direction of the limit value: H (High)
				100	Rate-of-change monitoring: positive gradient
				101	Rate-of-change monitoring: negative gradient
				110	Rate-of-change monitoring: absolute gradient
	0...11		0...3	0...15	Limit value channel 2, output 1 (high byte) in 0.1 %
		5	0...7	0...127	Limit value channel 2, output 1 (low byte) in 0.1 %
3	15	6	7	1	Channel in operation
	14...12		6...4	000	Actuating direction of the limit value: L (Low)
				001	Actuating direction of the limit value: H (High)
				100	Rate-of-change monitoring: positive gradient
				101	Rate-of-change monitoring: negative gradient
				110	Rate-of-change monitoring: absolute gradient
	0...11		0...3	0...15	Limit value channel 2, output 2 (high byte) in 0.1 %
		7	0...7	0...127	Limit value channel 2, output 2 (low byte) in 0.1 %

Value: 0 always has the contrary meaning

absolute address WORD: $W = 168 * (p - 1) + \text{rel. address}$
absolute address BYTE: $B = 336 * (p - 1) + \text{rel. address}$
                          p = module location no. in the subrack

Analogue Limit Monitor 62 100

Plant _____ Building _____ Switchroom_____

Parameterization of the module: Cabinet / Rack _____ Subrack _____ Module location _____

Channel 1 _____ Channel 2 _____

❏ **1oo2 operation of the sensors**

Channel 1	**Channel 1**
Input ❏ 4...20 mA / 1...5 V (with switch-off*)	Input ❏ 4...20 mA / 1...5 V (with switch-off*)
❏ 4...20 mA / 1...5 V (alarm only*)	❏ 4...20 mA / 1...5 V (alarm only*)
* when leaving the admissible input range	* when leaving the admissible input range
❏ 0...20 mA / 0...5 V	❏ 0...20 mA / 0...5 V

Line diagnosis of the outputs	❏ ON	Line diagnosis of the outputs	❏ ON
	❏ OFF		❏ OFF

Signal evaluation of output d18 _____ | **Signal evaluation of output d22** _____

❏ Limit value_____ %
   Hysteresis _____ %
❏ Rate of Change _____ % per _____ s
   ❏ positive ❏ negative ❏ absolut
Switching direction ❏ Low ❏ High

❏ Limit value_____ %
   Hysteresis _____ %
❏ Rate of Change _____ % per _____ s
   ❏ positive ❏ negative ❏ absolut
Switching direction ❏ Low ❏ High

Signal evaluation of output d20 _____ | **Signal evaluation of output d24** _____

❏ Limit value_____ %
   Hysteresis _____ %
❏ Rate of Change _____ % per _____ s
   ❏ positive ❏ negative ❏ absolut
Switching direction ❏ Low ❏ High

❏ Limit value_____ %
   Hysteresis _____ %
❏ Rate of Change _____ % per _____ s
   ❏ positive ❏ negative ❏ absolut
Switching direction ❏ Low ❏ High

1oo2 operation of the sensors

Evaluation of the sensors   ❏ Average value
                                ❏ Maximum value
                                ❏ Minimum value

Admissible value discrepancy_____ %
Admissible time discrepancy _____ s

Remarks

_____ _____

_____ _____

_____ _____

_____ _____

Made _____ Approved _____ Date _____ Signature _____