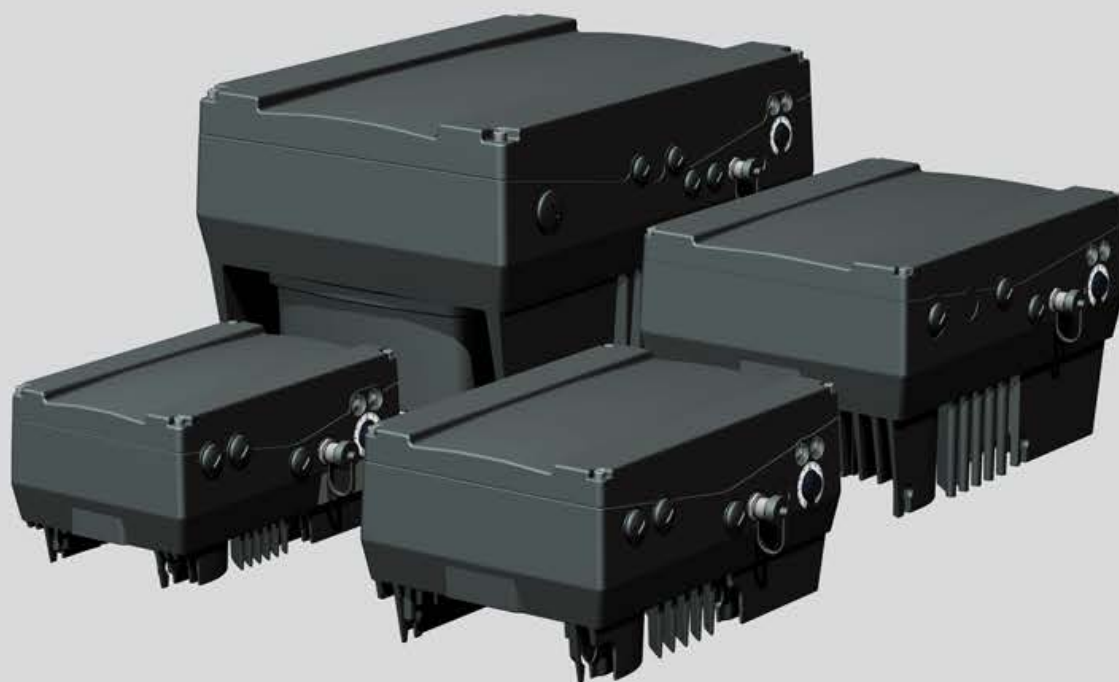


## Application Manual

2FC4...-1ST | 2FC4...-1PB | 2FC4...-1PN |  
2FC4...-1SC | 2FC4...-1CB



**G-Serie**  
**G-Series**  
Seitenkanal  
Side Channel



**C-Serie**  
**C-Series**  
Klaue  
Claw



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<b>1.100</b>	<b>Operating mode</b>				<b>Unit: Integer</b>
Relationship to parameter: 1.130 1.131 2.051 – 2.057 3.050 – 3.071	Parameter HB: S. xy	Transfer status: 2		min: 0 max: 3 Def: 0	Intrinsic value <b>(to be entered!)</b>
	Selection of operating mode. Following the software release (1,131) and hardware release, the drive controller runs with the setpoint of the selected setpoint source (1,130) at 0 = frequency setting mode, with the setpoint of the PID process controller (3,050 - 3,071) at 1 = PID process controller, with the frequencies specified in the parameters 2,051 - 2,057 at 2 = fixed frequencies, and via integrated soft PLC at 3 = selection				
9			8		7

Example of parameter table

- |   |   |   |
|---|---|---|
| <p>1 Parameter number</p> <p>2 Description in the parameters manual on page...</p> <p>3 Parameter name</p> <p>4 the drive controller</p> <p>5 Range of values (from - to - factory setting)</p> | <p>Transfer status<br/>0 = turn on and off to take over<br/>1 = at speed 0<br/>2 = in operation</p> | <p>6 Unit</p> <p>7 Box for entering the inherent value</p> <p>8 Explanation of the parameters</p> <p>9 Other parameters related to this parameter</p> |
|---|---|---|

## Ab Firmware 3.70

This functions enables the release and setpoint with the MMI (manual control unit). Operation only possible with connected MMI.

1.100	Operating mode		Unit: integer	
Relationship to parameter: 1.130 1.131 2.051 – 2.057 3.050 – 3.071	Parameter HB:  S. xy	Transfer status:  2	min: 0 max: 3 Def: 0	Intrinsic value <b>(to be entered!)</b>
<p>Selection of operating mode. Following the software release (1.131) and hardware release, the drive controller runs at <b>0 = frequency setting mode with the setpoint of the selected setpoint source (1.130)</b> 1 = PID process controller, with the setpoint of the PID process controller (3.050 - 3.071) 2 = fixed frequencies, with the frequencies specified in the parameters 2.051 - 2.057 3 = selection via integrated soft PLC</p>				
1.130	Setpoint source		Unit: integer	
Relationship to parameter: 3.062 – 3.069	Parameter HB:  S. xy	Transfer status:  2	min: 0 max: 10 Def: 1	Intrinsic value <b>(to be entered!)</b>
<p>Specifies the source from which the setpoint should be read. 0 = internal potentiometer 1 = analogue input 1 2 = analogue input 2 <b>3 = MANUAL CONTROL UNIT MMI/PC</b> 4 = SAS 6 = motor potentiometer 7 = total analogue inputs 1 and 2 8 = PID fixed setpoints (3.062 to 3.069) 9 = field bus 10 = integrated soft PLC</p>				

1.131	Software release		Unit: integer	
Relationship to parameter:	Parameter HB:	Transfer status:	min: 0	Intrinsic value (to be entered!)
1.132	S. xy	2	max: 13	
1.150			Def: 0	
2.050	<p><b>⚠ WARNING! Depending on the change made, the motor may start to run directly.</b></p> <p>Selection of the source for the control release.</p> <p>0 = digital input 1</p> <p>1 = digital input 2</p> <p>2 = digital input 3</p> <p>3 = digital input 4</p> <p>4 = analogue input 1 (must be selected in parameter 4.030)</p> <p>5 = analogue input 2 (must be selected in parameter 4.050)</p> <p>6 = field bus</p> <p>7 = SAS</p> <p>8 = digital input 1 right/digital input 2 left</p> <p>1.150 must be set to "0"</p> <p>9 = auto start</p> <p>10 = integrated soft PLC</p> <p>11 = fixed frequency inputs (all inputs that have been selected in parameter 2.050)</p> <p>12 = internal potentiometer</p> <p>13 = membrane keyboard (start &amp; stop keys)</p> <p><b>14 = MMI/PC</b></p> <p>15 = virtual output 1</p> <p>If the hardware release and a setpoint are applied, the motor may start to run directly!</p> <p>This cannot be prevented even with parameter 1.132.</p>			
4.030				
4.050				

1.100	Operating mode		Unit: integer	
Relationship to parameter: 1.130 1.131 2.051 – 2.057 3.050 – 3.071	Parameter HB:  S. xy	Transfer status:  2	min: 0 max: 3 Def: 0	Intrinsic value <b>(to be entered!)</b>
<p>Selection of operating mode. Following the software release (1.131) and hardware release, the drive controller runs at</p> <p><b>0 = frequency setting mode with the setpoint of the selected setpoint source (1.130)</b>  1 = PID process controller, with the setpoint of the PID process controller (3.050 - 3.071)  2 = fixed frequencies, with the frequencies specified in the parameters 2.051 - 2.057  3 = selection via integrated soft PLC</p>				
1.130	Setpoint source		Unit: integer	
Relationship to parameter: 3.062 – 3.069	Parameter HB:  S. xy	Transfer status:  2	min: 0 max: 10 Def: 1	Intrinsic value <b>(to be entered!)</b>
<p>Specifies the source from which the setpoint should be read.</p> <p><b>0 = internal potentiometer</b>  1 = analogue input 1  2 = analogue input 2  3 = MANUAL CONTROL UNIT MMI/PC  4 = SAS  6 = motor potentiometer  7 = total analogue inputs 1 and 2  8 = PID fixed setpoints (3.062 to 3.069)  9 = field bus  10 = integrated soft PLC</p>				

The frequency inverter presets a fixed output frequency after issue of software release.

1.100	Operating mode		Unit: integer	
Relationship to parameter: 1.130 1.131 2.051 – 2.057 3.050 – 3.071	Parameter HB:  S. xy	Transfer status:  2	min: 0 max: 3 Def: 0	Intrinsic value <b>(to be entered!)</b>
	Selection of operating mode. Following the software release (1.131) and hardware release, the drive controller runs at 0 = frequency setting mode with the setpoint of the selected setpoint source (1.130) 1 = PID process controller, with the setpoint of the PID process controller (3.050 - 3.071) <b>2 = fixed frequencies, with the frequencies specified in the parameters 2.051 - 2.057</b> 3 = selection via integrated soft PLC			
2.051	Fixed frequency		Unit: Hz	
Relationship to parameter: 1.020 1.021 1.100 1.150 2.050	Parameter HB:	Transfer status:	min: -400 max: +400 Def: 34	Intrinsic value <b>(to be entered!)</b>
	Fixed output frequency			

## 5 Activate motor potentiometer

Setpoint specification through two digital signals UP/DOWN, which are controlled, e.g. through simple stop button.

1.100	Operating mode		Unit: integer	
Relationship to parameter: 1.130 1.131 2.051 – 2.057 3.050 – 3.071	Parameter HB:	Transfer status:	min: 0	Intrinsic value <b>(to be entered!)</b>
	S. xy		max: 3	
		2	Def: 0	
Selection of operating mode. Following the software release (1.131) and hardware release, the drive controller runs at <b>0 = frequency setting mode with the setpoint of the selected setpoint source (1.130)</b> 1 = PID process controller, with the setpoint of the PID process controller (3.050 - 3.071) 2 = fixed frequencies, with the frequencies specified in the parameters 2.051 - 2.057 3 = selection via integrated soft PLC				

1.130	Setpoint source		Unit: integer	
Relationship to parameter: 3.062 – 3.069	Parameter HB:	Transfer status:	min: 0	Intrinsic value <b>(to be entered!)</b>
	S. xy		max: 10	
		2	Def: 1	
Specifies the source from which the setpoint should be read. 0 = internal potentiometer 1 = analogue input 1 2 = analogue input 2 3 = MANUAL CONTROL UNIT MMI/PC 4 = SAS <b>6 = motor potentiometer</b> 7 = total analogue inputs 1 and 2 8 = PID fixed setpoints (3.062 to 3.069) 9 = field bus 10 = integrated soft PLC				

2.150	MOP digital input		Unit: integer	
Relationship to parameter: 1.130 4.030 4.060	Parameter HB:	Transfer status:	min: 0	Intrinsic value <b>(to be entered!)</b>
	S. xy		max: 8	
		2	Def: 0	
Selection of the source to increase and decrease the setpoint. 0 = digital input 1 + / digital input 2 - 1 = digital input 1 + / digital input 3 - 2 = digital input 1 + / digital input 4 - 3 = digital input 2 + / digital input 3 - 4 = digital input 2 + / digital input 4 - 5 = digital input 3 + / digital input 4 - 6 = analogue Input 1 + / analogue Input 2 - (must be selected in parameter 4.030/4.060) 7 = DRIVE CONTROLLER soft PLC 8 = membrane keyboard (key 1 - / key 2 +)				



<b>2.151</b>	<b>MOP increment</b>		<b>Unit: %</b>	
Relationship to parameter: 1.020 1.021	Parameter HB:	Transfer status:	min: 0	Intrinsic value <b>(to be entered!)</b>
	S. xy	2	max: 100 Def: 1	
Increment at which the setpoint value is to be changed per key-stroke.				
<b>2.152</b>	<b>MOP increment time</b>		<b>Unit: s</b>	
Relationship to parameter:	Parameter HB:	Transfer status:	min: 0.02	Intrinsic value <b>(to be entered!)</b>
	S. xy	2	max: 1000 Def: 0.04	
Specifies the time in which the setpoint is summed up with permanently present signal.				
<b>2.153</b>	<b>MOP response time</b>		<b>Unit: s</b>	
Relationship to parameter:	Parameter HB:	Transfer status:	min: 0.02	Intrinsic value <b>(to be entered!)</b>
	S. xy	2	max: 1000 Def: 0.3	
Specifies the time until the present signal is considered to be permanent.				
<b>2.154</b>	<b>MOP retentive</b>		<b>Unit: integer</b>	
Relationship to parameter:	Parameter HB:	Transfer status:	min: 0	Intrinsic value <b>(to be entered!)</b>
	S. xy	2	max: 1 Def: 0	
Determines whether the setpoint of the motor potentiometer is retained even after power failure. 0 = deactivated 1 = activated				

This function must be activated when no PTC sensor (order option A11) or bimetal monitor (order option A31) is installed in the motor coil as excess temperature limit.

This function is deactivated at factory by P33.010 = 0 %.

33.010	I <sup>2</sup> T-Fakt.-Motor		Einheit: %	
Beziehung zu Parameter: 33.031 33.101	Parameter-HB:	Übernahmestatus:	min: 0	Eigener Wert ( <b>eintragen!</b> )
	S. xy	2	max: 1000	
			Def: 0	
Hier kann die prozentuale Strom-Schwelle (bezogen auf den Motorstrom 33.031) zum Start der Integration eingestellt werden. <b>NOTICE! Empfohlener Wert: 105%.</b>				
33.011	I <sup>2</sup> T Zeit		Einheit: s	
Beziehung zu Parameter: 33.100	Parameter-HB:	Übernahmestatus:	min: 0	Eigener Wert ( <b>eintragen!</b> )
	S. xy	2	max: 1200	
			Def: 25	
Zeit, nachdem der Antriebsregler mit I <sup>2</sup> T abschaltet. <b>NOTICE! Empfohlener Wert: 30s.</b>				

This function limits the motor current to a programmed maximum value, after reaching a parametrised current-time area.

This motor current limit is monitored at the application level and thus limited with relatively small dynamics. This has to be considered in the selection of this function.

The maximum value is determined by the parameter "motor current limit in %" (5.070). This is expressed in percentage and is based on the rated motor current from the type plate data "motor current" (33.031).

The maximum current-time area is calculated as the product of the parameter "motor current limit in s" (5.071) and the constant over current of 50% of the desired motor current limit.

As soon as this current-time area is exceeded, the motor current is limited by reducing the rotation speed to the limit value. Thus, if the output current of the drive controller exceeds the motor current (parameter 33.031) multiplied by the set limit in % (parameter 5.070) for the set time (parameter 5.071), the motor speed is reduced until the output current drops below the set limit.

The scaling down is done by a PI controller that works depending on the current difference.

The entire feature can be deactivated by setting the parameter "motor current limit in %" to zero (5.070).

5.070	Motor current limit		Unit: %	
Relationship to parameter: 5.071 33.031	Parameter HB:	Transfer status:	min: 0	Intrinsic value <b>(to be entered!)</b>
	S. xy	2	max: 250	
			Def: 0	
0 = deactivated				

5.071	Motor current limit		Unit: s	
Relationship to parameter: 5.070 33.031	Parameter HB:	Transfer status:	min: 0	Intrinsic value <b>(to be entered!)</b>
	S. xy	2	max: 100	
			Def: 1	

5.075	Transmission factor		Unit:	
Relationship to parameter: 33.034	Parameter HB:	Transfer status:	min: 0	Intrinsic value <b>(to be entered!)</b>
	S. xy	2	max: 10000	
			Def: 1	
Here, a transmission factor can be set. With the help of the transmission factor, the display of the mechanical speed can be adapted.				

In this operating mode, fixed frequency setpoints are passed on to the motor control. There are 7 fixed frequencies (2.051 - 2.057) which are linked in BCD format to the digital inputs 1 to 3. These seven fixed frequencies can be enabled via the parameter "Auswahl\_Festfrequenz" (2.050) into three groups:

0 = fixed frequency 1, 1 = fixed frequency 1 to 3, 2 = fixed frequency 1 to 7.

### Logic table of fixed frequencies

DI 3	DI 2	DI 1	Selection	Parameters	Presetting
0	0	1	Fixed frequency 1	2.051	34 Hz
0	1	0	Fixed frequency 2	2.052	67 Hz
0	1	1	Fixed frequency 3	2.053	50 Hz
1	0	0	Fixed frequency 4	2.054	0 Hz
1	0	1	Fixed frequency 5	2.055	0 Hz
1	1	0	Fixed frequency 6	2.056	0 Hz
1	1	1	Fixed frequency 7	2.057	0 Hz

1.100	Operating mode		Unit: integer	
Relationship to parameter: 1.130 1.131 2.051 – 2.057 3.050 – 3.071	Parameter HB:  S. xy	Transfer status:  2	min: 0 max: 3 Def: 0	Intrinsic value <b>(to be entered!)</b>
Selection of operating mode. Following the software release (1.131) and hardware release, the drive controller runs at 0 = frequency setting mode with the setpoint of the selected setpoint source (1.130) 1 = PID process controller, with the setpoint of the PID process controller (3.050 - 3.071) <b>2 = fixed frequencies, with the frequencies specified in the parameters 2.051 - 2.057</b> 3 = selection via integrated soft PLC				

1.131	Software release		Unit: integer	
Relationship to parameter: 1.132 1.150 2.050 4.030 4.060	Parameter HB:  S. xy	Transfer status:  2	min: 0 max: 13 Def: 0	Intrinsic value (to be entered!)
<p><b>⚠ WARNING! Depending on the change made, the motor may start to run directly.</b>            Selection of the source for the control release.            0 = digital input 1            1 = digital input 2            2 = digital input 3            3 = digital input 4            4 = analogue input 1 (must be selected in parameter 4.030)            5 = analogue input 2 (must be selected in parameter 4.060)            6 = field bus            7 = SAS            8 = digital input 1 right/digital input 2 left            1.150 must be set to "0"            9 = auto start            10 = integrated soft PLC  <b>11 = fixed frequency inputs (all inputs that have been selected in parameter 2.050)</b>            12 = internal potentiometer            13 = membrane keyboard (start &amp; stop keys)            14 = MMI/PC            15 = virtual output 1            If the hardware release and a setpoint are applied, the motor may start to run directly!            This cannot be prevented even with parameter 1.132.</p>				
2.050	Fixed frequency		Unit: integer	
Relationship to parameter: 1.100 2.051 - 2.057	Parameter HB:	Transfer status:	min: 0 max: 3 Def: 1	Intrinsic value (to be entered!)
<p>Selection of the digital inputs used for the fixed frequencies.            0 = digital In 1 (fixed frequency 1)(2.051)  <b>1 = digital In 1, 2 (fixed frequencies 1 - 3) (2.051 - 2.053)</b>            2 = digital In 1, 2, 3 (fixed frequencies 1 - 7) (2.051 - 2.057)            3 = membrane keyboard (key 1 = fixed frequency 1/key 2 = fixed frequency 2)</p>				
2.051 - 2.057	Fixed frequency		Unit: Hz	
Relationship to parameter: 1.020 1.021 1.100 1.150 2.050	Parameter HB:	Transfer status:	min: -400 max: +400 Def: 2.051: 34 2.052: 67 2.053: 50	Intrinsic value (to be entered!)
<p>The frequencies that should be output at the digital inputs 1 - 3 set in parameter 2.050, depending on the switching pattern.</p>				

The setpoint for the PID process controller is read as percentage in the "frequency setting mode" operating mode. 100% corresponds to the working range of the connected sensor, which is read from the actual value input (selected by the "PID actual value").

Depending on the control deviation, a speed controller output is issued at the controller output, based on the amplification factors for the P component (3,050), I component (3,051) and D component (3,052). In order to prevent the increase of the integral component to infinity in the case of uncontrollable control deviations, it is also limited to the controller output threshold when reaching the same (corresponds to "maximum frequency" (1,021)).

3.100	Operating mode		Unit: integer	
Relationship to parameter: 1.130 1.131 2.051 – 2.057 3.050 – 3.071	Parameter HB:  S. xy	Transfer status:  2	min: 0 max: 3 Def: 0	Intrinsic value <b>(to be entered!)</b>
Selection of operating mode. Following the software release (1.131) and hardware release, the drive controller runs at 0 = frequency setting mode with the setpoint of the selected setpoint source (1.130) <b>1 = PID process controller, with the setpoint of the PID process controller (3.050 - 3.071)</b> 2 = fixed frequencies, with the frequencies specified in the parameters 2.051 - 2.057 3 = selection via integrated soft PLC				

3.050	PID P gain		Unit:	
Relationship to parameter: 1.100 1.130	Parameter HB:  S. xy	Transfer status:  2	min: 0 max: 100 Def: 0.25	Intrinsic value <b>(to be entered!)</b>
Gain factor proportional component of the PID controller. <b>NOTICE! The smaller this value, the slower the process controller reacts.</b>				

3.051	PID I gain		Unit: s <sup>-1</sup>	
Relationship to parameter: 1.100 1.130	Parameter HB:  S. xy	Transfer status:  2	min: 0 max: 100 Def: 0.25	Intrinsic value <b>(to be entered!)</b>
Gain factor integral component of the PID controller. <b>NOTICE! The smaller this value, the slower the process controller reacts.</b>				

3.060	PID feedback		Unit: integer	
Relationship to parameter: 1.100 1.130 3.061	Parameter HB:  S. xy	Transfer status:  2	min: 0 max: 2 Def: 1	Intrinsic value <b>(to be entered!)</b>
Selection of the input source, from which the actual value for the PID process controller is read. 0 = analogue input 1 <b>1 = analogue input 2</b> 2 = integrated soft PLC				

## PID inverse

Inversion of the PID feedback can be done with the help of parameter 3.061. The actual value is read invertedly, i.e. 0V...10V correspond internally to 100% ... 0%.

Please bear in mind that Alx-phys min (4.034/4.064) and Alx-phys max (4.035/4.065) need to be exchanged.

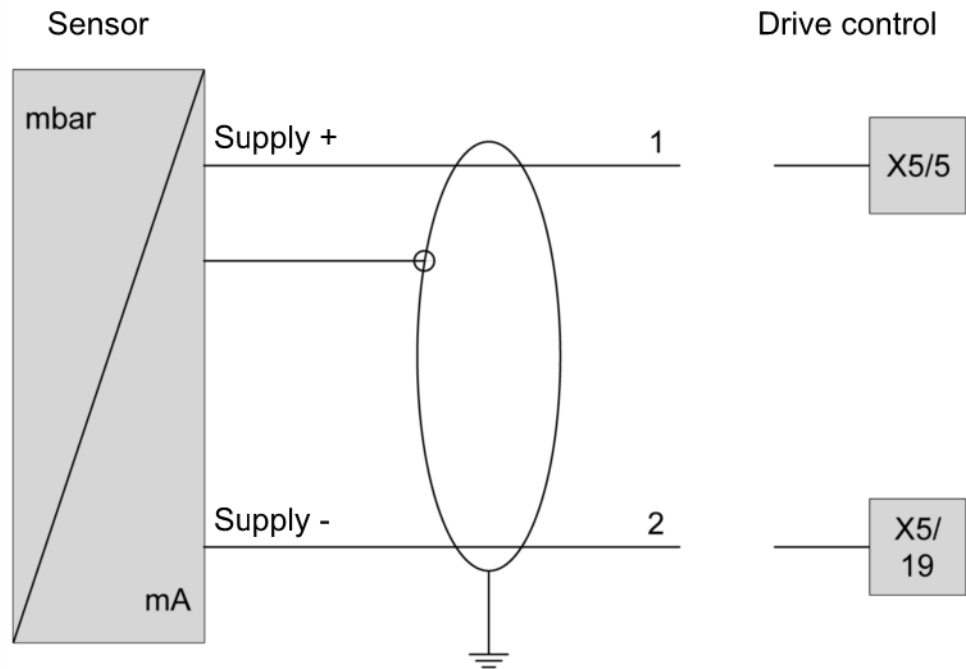
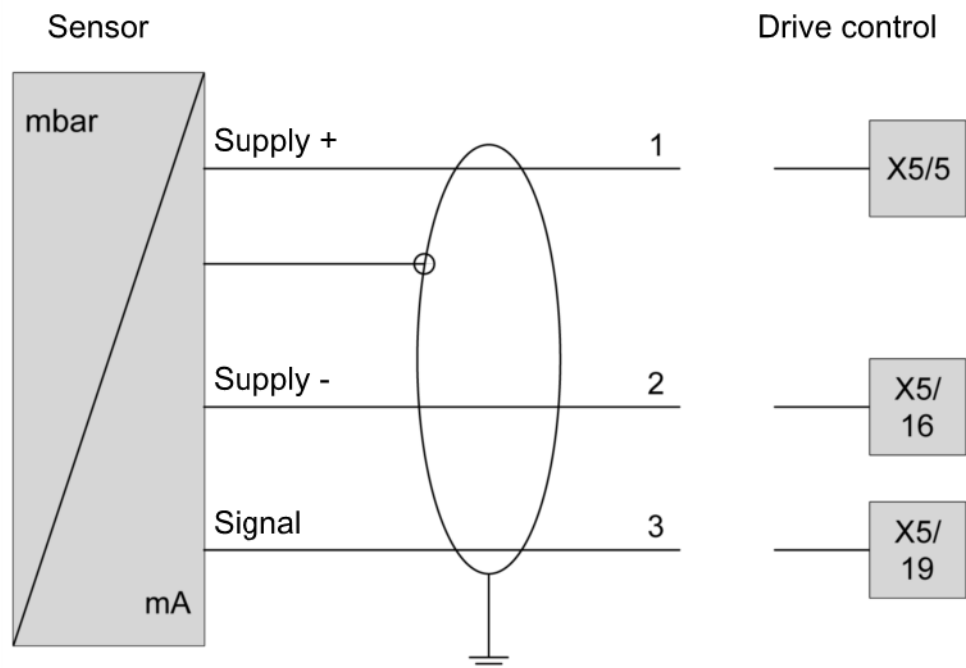
### Example

A sensor - 1000...0 mbar with an analogue output signal 4...20 mA is to be operated at Alx as the actual value source. At an output quantity of -250 mbar (16 mA), it should be regulated inversely. The physical minimum complies with -1000 mbar; the physical maximum complies with 0 mbar. The setpoint to be specified is 25%.

3.061	PID inverse		Unit: integer	
Relationship to parameter: 3.060	Parameter HB:	Transfer status:	min: 0	Intrinsic value <b>(to be entered!)</b>
	S. xy	2	max: 1	
			Def: 0	
The actual value source (parameter 3.060) is inverted. 0 = deactivated 1 = activated				
3.062 – 3.068	PID fixed setpoints		Unit: %	
Relationship to parameter: 1.100 1.130	Parameter HB:	Transfer status:	min: 0	Intrinsic value <b>(to be entered!)</b>
	S. xy	2	max: 100	
			Def: 0	
PID fixed setpoint values that should be output at the digital inputs 1 – 3 set in parameter 3.069, depending on the switching pattern (must be selected in parameter 1.130).				
3.069	PID fixed setpoint mode		Unit: integer	
Relationship to parameter: 1.100 3.062 – 3.068	Parameter HB:	Transfer status:	min: 0	Intrinsic value <b>(to be entered!)</b>
	S. xy	2	max: 2	
			Def: 0	
Selection of the digital inputs used for the fixed frequencies. 0 = digital In 1 (PID fixed setpoint 1) (3.062) 1 = digital In 1, 2 (PID fixed setpoint 1-3) (3.062 to 3.064) 2 = digital In 1, 2, 3 (PID fixed setpoint 1-7) (3.062 - 3.068)				
4.020/4.050	Alx input type		Unit: integer	
Relationship to parameter:	Parameter HB:	Transfer status:	min: 1	Intrinsic value <b>(to be entered!)</b>
	S. xy	2	max: 2	
			Def: 4.020 1 4.050 2	
Function of the analogue inputs 1/2. 1 = voltage input 2 = current input				

4.021/4.051		Alx-Norm. Low		Unit: %	
Relationship to parameter:	Parameter HB:	Transfer status:	min: 0	Intrinsic value <b>(to be entered!)</b>	
	S. xy	2	max: 100		
			Def: 0		
Specifies the minimum value of the analogue inputs as a percentage of the final range value. Example: 0... 10V or 0... 20 mA = 0 %... 100% 2... 10V or 4... 20mA = 20%... 100%					
4.022/4.052		Alx-Norm. High		Unit: %	
Relationship to parameter:	Parameter HB:	Transfer status:	min: 0	Intrinsic value <b>(to be entered!)</b>	
	S. xy	2	max: 100		
			Def: 100		
Specifies the maximum value of the analogue inputs as a percentage of the final range value. Example 0...10V or 0...20mA = 0%...100% 2...10V or 4...20mA = 20%...100%					
4.023/4.053		Alx backlash		Unit: %	
Relationship to parameter:	Parameter HB:	Transfer status:	min: 0	Intrinsic value <b>(to be entered!)</b>	
	S. xy	2	max: 100		
			Def: 0		
Backlash as percentage of final range value of the analogue inputs.					
4.024/4.054		Alx filtering time		Unit: s	
Relationship to parameter:	Parameter HB:	Transfer status:	min: 0.02	Intrinsic value <b>(to be entered!)</b>	
	S. xy	2	max: 1.00		
			Def: 0		
Filtering time of the analogue inputs in seconds.					



**Connection 2 - Conductor sensor**

*Connection 2 - Conductor sensor*
**Connection 3 - Conductor sensor**

*Connection 3 - Conductor sensor*



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Rietschle**

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