

# 1 Sensor Input Option MCB 114

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## 1.1 Introduction

### 1.1.1 Sensor Input Option MCB 114

The sensor input option card MCB 114 is supposed to be used in e.g. the following cases:

- Sensor input for temperature transmitters PT100 and PT1000 for monitoring bearing temperatures
- As general extension of analogue inputs with one additional input for multi-zone control or differential pressure measurements
- Support extended PID controllers with I/Os for set point, transmitter/sensor inputs

### 1.1.2 Configuration

- The 3 sensor inputs supports 2 and 3 wire sensors and an auto detection of sensor type, PT100 or PT1000 takes places at power up.
- The analogue input is capable to handle 0/4-20mA

## 1.2 MCB 114 Function

MCB 114 Sensor Input Option is designed for bearing monitoring. Typical motors designed with temperature sensors in order to protect the bearings from being overloaded are fitted with three PT100/1000 temperature sensors. One in the front-, one in the back end bearing and one in the motor windings. The Danfoss option MCB 114 supports all three sensors with individual temperature limits for under/over temperature.

### 1.2.1 MCB 114 Function

The option can generate an alarm if the measured temperature is either below low limit or above high limit specified by the user. The individual measured temperature on each sensor input can be read out in the display or by read out parameters. If an alarm occurs the relays or digital outputs can be programmed to be active high by choosing option [21] *Thermal Warning* in par. group 5-\*\*.

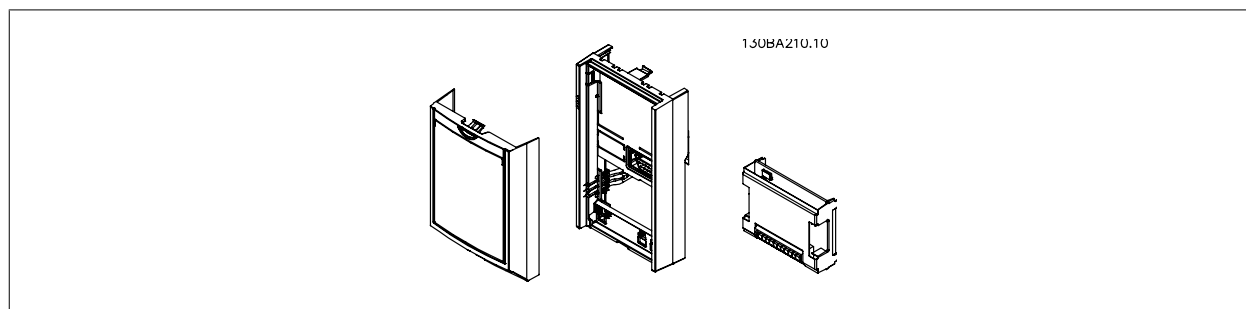
The analogue input on MCB 114 can be used as any other analogue input on Danfoss VLT® FC-xxx Drive and the value can be read out in the display or by readout parameter.

A fault condition has a common Warning/Alarm number associated with it, which is Alarm/warning [20] (Temp. input error)

Any present output can be programmed to be active in case of the warning or Alarm appears.

### 1.2.2 Ordering Code Numbers and Parts Delivered

Standard version code no: 130B1172 Coated version code no: 130B1272



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### 1.3 Electrical and Mechanical Specifications

#### 1.3.1 Electrical and Mechanical Specifications

##### Analogue Input

Number of analogue input	1
Format	0..20mA or 4..20mA
Wires	2 wires
Input Impedance	<200Ω
Sample rate	1kHz
3rd order filter	100Hz at 3 dB

Table 1.1: The option is able to supply the analogue sensor with 24V DC (terminal 1)

##### Temperature Sensor Input

Number of analogue input supporting	3
PT100/1000	
Signal type	PT100 / PT1000
Connection	PT100 2 or 3 wire
	PT1000 2 or 3 wire
Frequency PT100 and PT1000 input	1 Hz for each channel
Resolution	10bit
Temperature range:	-50 - 204°C
	-58 - 399°F

#### 1.3.2 Galvanic Insulation

The sensors to be connected are expected to be galvanic insulated from the main s voltage level. Safety demands: IEC 61800-5-1 and UL508C.

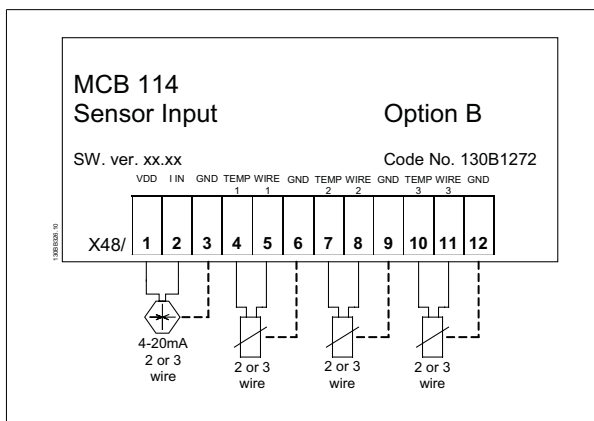
#### 1.3.3 Cabling

Maximum signal cable length is 500m.

#### 1.3.4 Option Module SW Support

The option is supported in VLT AQUA FC202 from software version 1.41

#### 1.3.5 Electrical Wiring



Terminal Name	Function
1	VDD 24VDC to supply 4-20mA sensor
2	I in 4-20mA input
3	GND Analogue input GND
4, 7, 10	Temp 1, 2, 3 Temperature input
5, 8, 11	Wire 1, 2, 3 3 <sup>rd</sup> wire input if three wire sensors are used
6, 9, 12	GND Temp. input GND

### 1.3.6 Mounting Guideline

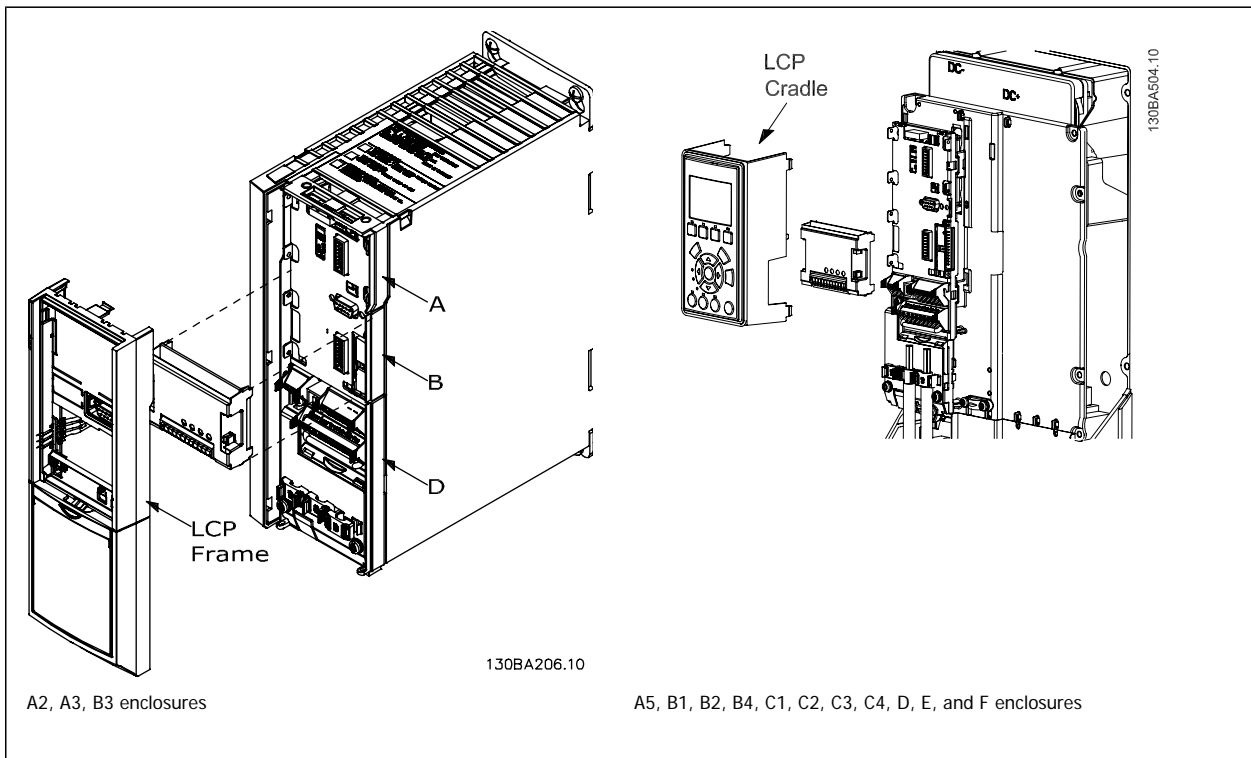
The power to the frequency converter must be disconnected.

For A2, A3 and B3 enclosures:

- Remove the LCP (Local Control Panel), the terminal cover, and the LCP frame from the frequency converter.
- Fit the MCB1xx option card into slot B.
- Connect the control cables and relieve the cable by the enclosed cable strips.  
Remove the knock out in the extended LCP frame delivered in the option set, so that the option will fit under the extended LCP frame.
- Fit the extended LCP frame and terminal cover.
- Fit the LCP or blind cover in the extended LCP frame.
- Connect power to the frequency converter.
- Set up the input/output functions in the corresponding parameters, as mentioned in this document.

For A5, B1, B2, B4, C1, C2, C3, D, E, and F enclosures:

- Remove the LCP and the LCP cradle
- Fit the MCB1xx option card into slot B
- Connect the control cables and relieve the cable by the enclosed cable strips
- Fit the cradle
- Fit the LCP



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## 1.4 Programming Temperature Sensor Inputs

### 35-00 Temp Sensor 1 Temp Unit

**Option:** **Function:**

[60] \* Temperature unit Celsius °C

[160] Temperature unit Fahrenheit °F

### 35-01 Temp Sensor 1 Input Type

**Option:** **Function:**

Sensor type is auto tuned during start up.

[0] Not Connected

[1] PT100 2 wire

[3] PT1000 2 wire

[5] PT100 3 wire

[7] PT1000 3 wire

### 35-02 Temp Sensor 2 Temp Unit

**Option:** **Function:**

[60] \* Temperature unit Celsius °C

[160] Temperature unit Fahrenheit °F

### 35-03 Temp Sensor 2 Input Type

**Option:** **Function:**

Sensor type is auto tuned during start up.

[0] Not Connected

[1] PT100 2 wire

[3] PT1000 2 wire

[5] PT100 3 wire

[7] PT1000 3 wire

### 35-04 Temp Sensor 3 Temp Unit

**Option:** **Function:**

Sets the unit used as temperature unit.

[60] \* Temperature unit Celsius °C

[160] Temperature unit Fahrenheit °F

### 35-05 Temp Sensor 1 Input Type

**Option:** **Function:**

Sensor type is auto tuned during start up.

[0] Not Connected

[1] PT100 2 wire

[3] PT1000 2 wire

[5] PT100 3 wire

[7] PT1000 3 wire

### 35-06 Temperature Sensor Alarm Function

**Option:**
**Function:**

Choose action/event in case of Alarm/Warning

[0] *	Off	No action
[2]	Stop	Stop the drive (Only relevant in combination with cascade)
[5]	Stop and trip	Stop the drive and trip

### 35-14 Filter Time Constant Sensor Input 1

**Range:**
**Function:**

Enter the time constant for the first order digital low pass filter, suppressing electrical noise on the input. A high time constant improves dampening but also increases the time delay through the filter.

1ms\* [1ms – 10s]

### 35-15 Temperature Monitor Sensor Input 1

**Option:**
**Function:**

Enable or disable the monitoring function for the sensor inputs. If disabled the input status can still be read in par. 18-37/38/39 and they are available as a display readout. If enabled the function specified in par. 35-06 will occur if an alarm condition is present. If a sensor is not connected the parameter will be hidden in the LCP

[0] *	Disabled
[1]	Enabled

### 35-16 Low Temperature Limits Sensor Input 1

**Range:**
**Function:**

Low limit alarm condition

[-50°C/-58°F - High temp limit  
(par. 35-17)]

### 35-17 High Temperature Limits Sensor Input 1

**Range:**
**Function:**

High limit alarm condition

[Low temp limit (par. 35-16)  
- 204°C/399°F]

### 35-24 Filter time constant sensor input 2

**Range:**
**Function:**

Enter the time constant for the first order digital low pass filter, suppressing electrical noise on the input. A high time constant improves dampening but also increases the time delay through the filter.

1ms\* [1ms – 10s]

### 35-25 Temperature Monitor Sensor Input 2

**Option:**
**Function:**

Enable or disable the monitoring function for the sensor inputs. If disabled the input status can still be read in par. 18-37/38/39 and they are available as a display readout. If enabled the function specified in par. 35-06 will occur if an alarm condition is present.  
If a sensor is not connected the parameter will be hidden in the LCP

[0] *	Disabled
[1]	Enabled

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### 35-26 Low Temperature Limits Sensor Input 2

**Range:**

[-50°C/-58°F - high temp limit  
par. 35-27]

**Function:**

Low limit alarm condition

### 35-27 High Temperature Limits Sensor Input 2

**Range:**

[Low temp limit (par. 35-26)  
- 204°C/399°F]

**Function:**

High limit alarm condition

### 35-34 Filter Time Constant Sensor Input 3

**Range:**

1ms\* [1ms – 10s]

**Function:**

Enter the time constant for the first order digital low pass filter, suppressing electrical noise on the input. A high time constant improves dampening but also increases the time delay through the filter.

### 35-35 Temperature Monitor Sensor Input 3

**Option:**

[0] \* Disabled  
[1] Enabled

**Function:**

Enable or disable the monitoring function for the sensor inputs. If disabled the input status can still be read in parameter 18-37/38/39 and they are available as a display readout. If enabled the function specified in par. 35-06 will occur if an alarm condition is present.  
If a sensor is not connected the parameter will be hidden in the LCP

### 35-36 Low Temperature Limits Sensor Input 3

**Range:**

[-50°C/-58°F - high temp limit  
par. 35-37]

**Function:**

Low limit alarm condition

### 35-37 High Temperature Limits Sensor Input 3

**Range:**

[Low temp limit (par. 35-36) -  
204°C/399°F]

**Function:**

High limit alarm condition

## 1.5 Programming Analogue Input 1 on MCB 114

### 35-42 Analogue Input 1 On MCB 114 Low Current

**Range:**

4mA\* [0.00mA – par. 35-43]

**Function:**

Enter the current value corresponding to the low reference/feedback specified in par. 35-44. The value must be set higher

### 35-43 Analogue Input 1 On MCB 114 High Current

**Range:**

20mA\* [Par. 35-42 – 20mA]

**Function:**

Enter the current value corresponding to the high reference/feedback specified in par. 35-45.

**35-44 Low Ref./Feedb. Value****Range:**

0.000 N/A\* [-999.999,999 – 999.999,999 N/A]

**Function:**

Enter the analogue scaling value corresponding to the low current set in par. 35-42.  
The value can be higher than the value of par. 35-45

**35-45 High Ref./Feedb. Value****Range:**50.000 [-999999.999 – 999999.999 N/A]  
N/A\***Function:**

Enter the analogue scaling value corresponding to the high current set in par. 35-43.  
The value can be higher than the value of par. 35-44

**35-46 Analogue Input 1 On MCB 114 Filter Time Constant****Range:**

1ms\* [1ms – 10s]

**Function:**

Enter the time constant for the first order digital low pass filter, suppressing electrical noise on the input. A high time constant improves dampening but also increases the time delay through the filter.

**35-47 Analogue Input 1 On MCB 114 Live Zero****Option:**

[0] Disable

[1] \* Enable

**Function:**

Enable or disable Live Zero. See parameter par. 6-00 and par. 6-01

## 1.6 Additional Read Out Options

**Additional Display Read Out Options in Par. 0-20 Through 0-24****Option:**

[1836] Analogue input 1 4-20mA on MCB 114 View actual current in mA measured on the analogue input 1 on MCB 114

[1837] Temperature read out sensor 1 on MCB 114 Currently measured temperature on sensor input 1. If no sensor is connected the value is 0.

[1838] Temperature read out sensor 2 on MCB 114 Currently measured temperature on sensor input 2. If no sensor is connected the value is 0.

[1839] Temperature read out sensor 3 on MCB 114 Measured temperature on sensor input 3. If no sensor is connected the value is 0.