Trigentic AB

EmpirBus Connect-50 User manual

Art.no 2110110, 2110111

1. Introduction

This document contains basic specifications, installation instructions, manual channel override and fuse reset instructions. This and other documents are available at www.trigentic.com.

2. Safety guidelines and measures

In order to avoid accidental short circuits, make sure to disconnect the power supply to the Connect-50 before making any connections.

3. Scope of Delivery

Use manual including CE and FCC declaration of conformity

4. Model Range

Both the unit and the box are marked with model number.

12V unit								12V unit							
2110110 Manual overide, LED indication								2110111 Manual overide, LED indication							
Channel	**Input, with "Signal drive 50mA"**	**Dimmable "Signal drive"**	**Output Plus 10A**	**Output Minus 6A**	**Counter input 0-10kHz**	**Optional CAN (isolated)**	**RS485 (isolated)**	**Channel**	**Input, with "Signal drive 50mA"**	**Dimmable "Signal drive"**	**Output 10A**	**Output Minus 6A**	**Counter input 0-10kHz**	**Optional CAN (isolated)**	**RS485 (isolated)**
1			o					1			o				
2			o					2			o				
3			o	o				3			o	o			
4			o	o				4			o	o			
5			o					5			o				
6	o	+/-			o			6	o	+/-			o		
7	o	+/-						7	o	+/-					
8	o	+/-						8	o	+/-					
9			o					9			o				
10			o					10			o				
11			o					11			o				
12			o					12			o				
13			o					13			o				
14	o	+/-						14	o	+/-					
15	o	-						15	o	-					
16	o	-						16	o	-					
17			o					17			o				
18			o					18			o				
19			o					19			o				
20			o					20			o				
21			o					21			o				
22	o				o			22	o				o		
23	o							23						Hi	
24	o							24						Low	
25			o					25			o				
26			o					26			o				
27			o					27			o				
28			o					28			o				
29			o					29			o				
30	o							30							Tx
31	o							31							Rx
32	Sensor GND							32	Sensor GND						

Table 4.1: Model range

5. Installation

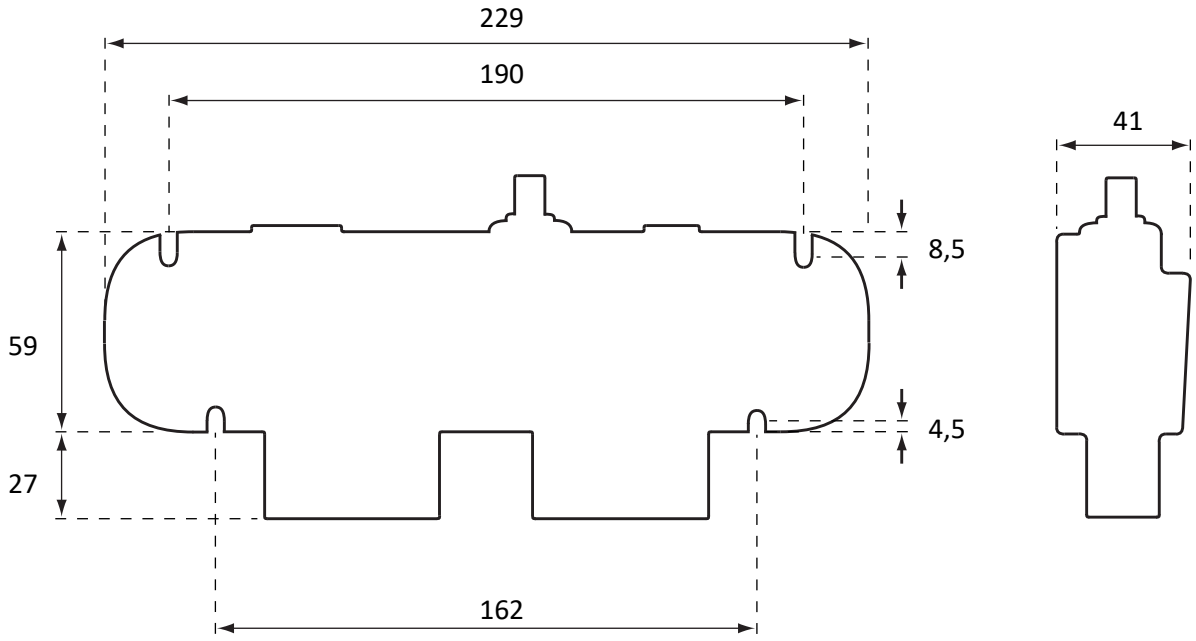
5.1 System limitations

Possible combination with Connect-50

- Max 2pcs Connect-50 can be connected in the same network
- Connect-50 in “master mode” can handle maximum up to 4 bus ID.
- Maximum library component in logic schema whit Connect-50 in master mode, 500pcs.

5.2 Mounting

The unit should be mounted on a flat vertical surface with four screws (not included), with the orientation as shown in figure 5.1.



[mm] (Drawing is not to scale.)

Figure 5.1: Dimensions

5.3 Power feed

The power is supplied on the two M6 bolts with positive on the left (marked with +) and negative on the right (marked with -). The total max output is 50A.

5.4 Connectors

The bus connector is an NMEA2000 compatible male Micro-C 5 pin connector. It is not recommended to connect a T-connector directly to the unit; a drop cable should be between the main bus and the unit.

The consumers in and outputs are connected via connectors. Only use correct crimp and extractor tools when assembling the connector. Unused pins in the connector should be plugged with circuit plugs in order to maintain IP65.

6. Circuits

The usage of a channel is determined by the model, option configuration and programming. For pinout, see figure 6.1. The Connect-50 connector accepts cable dimensions up to 2.5 mm^2.

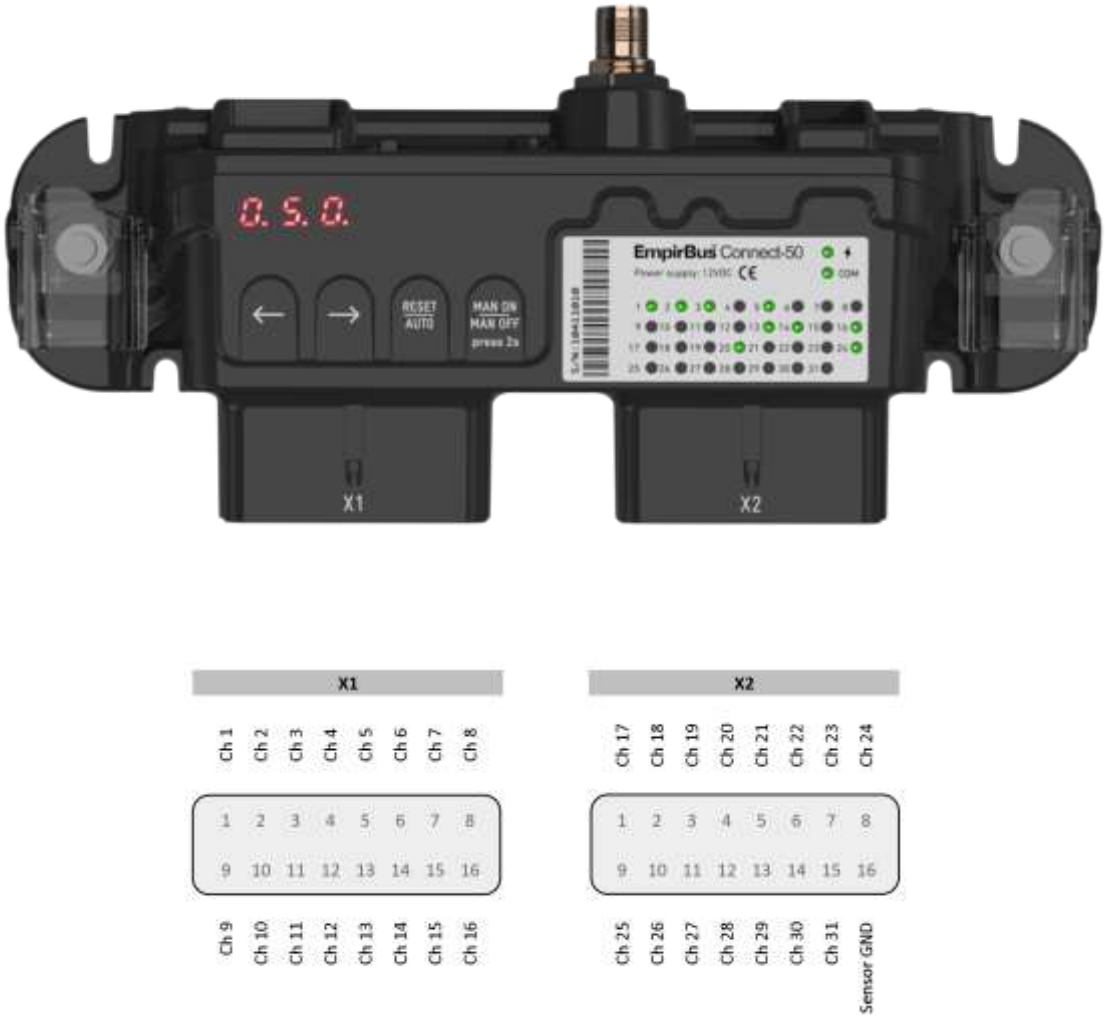


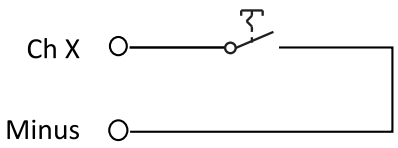
Figure 6.1: pinout

6.1 Inputs

Any input channel can be configured as digital or analog input.

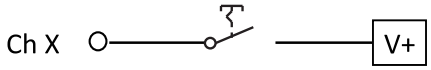
6.1.1 Digital input – negative

Connect the switch directly between minus and the desired channel.



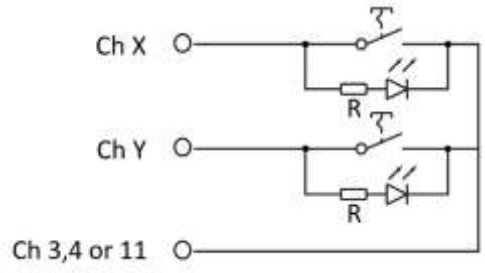
6.1.2 Digital input – positive

Connect the switch between the source and the desired channel. See data sheet for measuring range
NOTE: The input signal source and the CCM must have common ground.



6.1.3 Digital input – commonline

It is possible to have a switch and a LED indicator on the same channel using the circuit below. The commonline channel then needs to be connected to channel 3, 4 or 11.



The value of the resistor R can be calculated using:
R = (Voltage supply – LED forward voltage) / 0.020A

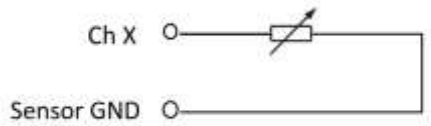
LED forward voltage (Vf) = nominal 1.7 – 2.2 V

Example 12V system:

14.5V – 1.7V = 12.8V
12.8 / 0,020 = 640Ω minimum
(680Ω or higher recommended)

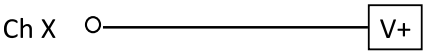
6.1.4 Analog input – resistance

Connect the resistive sensor directly between “Sensor GND” pin 32 and the desired channel.



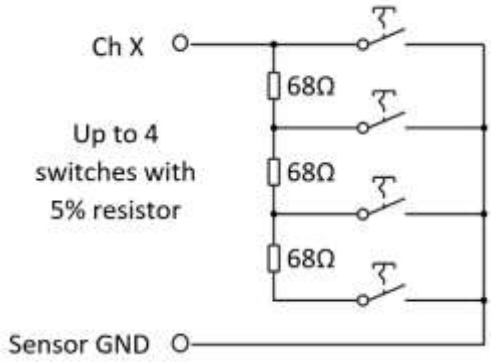
6.1.5 Analog input – voltage

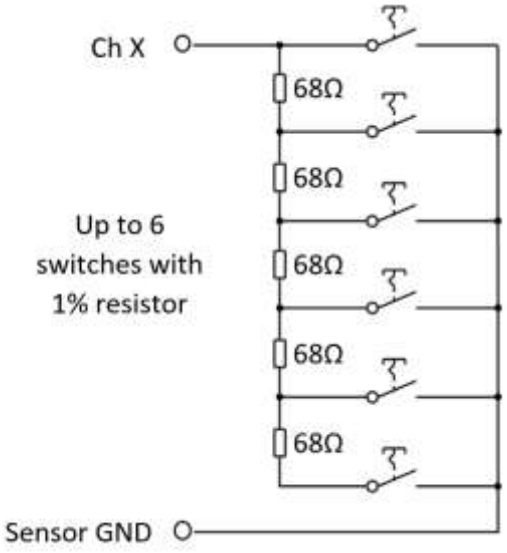
Connect the voltage source to the desired channel. See data sheet for measuring range. **NOTE: The input signal source and the Connect-50 must have common ground.**



6.1.6 Analog input – multi switch

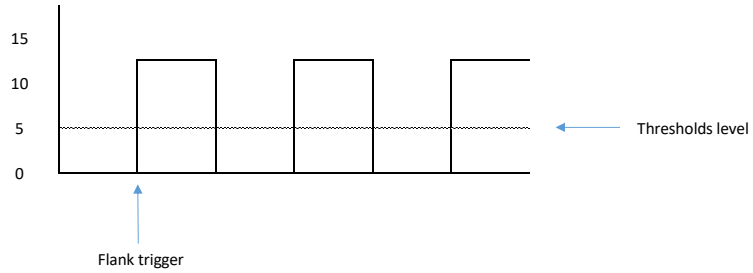
The circuit below enables four separate momentary switches to be connected to a single input channel. Connect the circuit to “Sensor GND” pin 32 and the desired channel. **Note: Multi switch channel setting is only possible for momentary switches. Only one button can be pressed at a time.**





6.1.7 Frequency input - digital

Channel 6 and 22 could be configured to frequency input. Input signal is flank triggered at positive flank with configurable thresholds level.



6.1.8 Signal drive - output

Input channel can be configured to drive up to 50mA plus or minus. This will be supplied via an internal resistance, see below table for voltage drop.

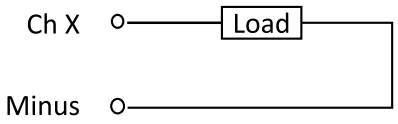
Load	**Voltage drop internal (+/- 20%)**
10mA	1,3V
20mA	2,0V
30mA	2,7V
40mA	3,4V
50mA	4,0V

6.2 Outputs

Depending on the model, certain channels can be configured to be outputs. See the table 4.1 for model specification.

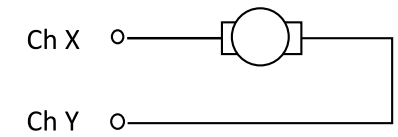
6.2.1 Digital output – positive

Connect the load directly between the desired channel and minus. **Note: Not use "Sensor GND" pin 32 as a Negative.**



6.2.2 Digital output – half bridge

For actuators and other equipment that use shifting polarity, connect the equipment directly between two channels with minus output capability.



6.2.3 Digital output – Window wiper

Connect-50 can support up to two window wipers. Depending of the electrical design of the window wiper, two different circuits are possible. Most common is window wiper circuit 1. See figure 6.2.

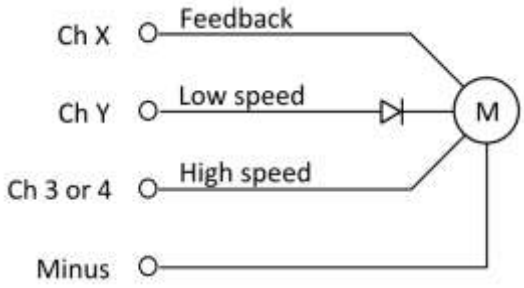


Figure 6.2: Window wiper circuit 1

Any channel can be used for Ch X and Ch Y. Channel 3 or 4 is used as high speed channel. **Note: The diode is never connected to channel 3 or 4.**

Less common is window wiper circuit 2. See figure 6.3.

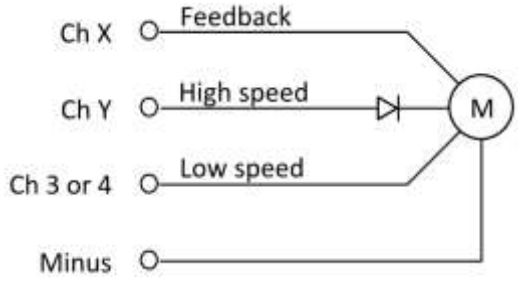


Figure 6.3: Window wiper circuit 2

Any channel can be used for Ch X and Ch Y. Channel 3 or 4 is used as low speed channel. **Note: The diode is never connected to channel 3 or 4.**

6.3 Serial interface

Depending on the model optional CAN and RS485 is available. See the table 4.1 for model specification.

6.3.1 Optional CAN-bus

The optional CAN-bus is galvanic isolated, Ch 23 = CAN Hi and Ch 24 = CAN Low. LED indication 23 will indicate when transmitting message “Tx” and LED indication 24 will indicate when receiving message “Rx” to Connect-50.

Two external 120-ohm terminal resistor must be installed in each end of the CAN-bus.

6.3.2 RS485

RS485 is galvanic isolated, Ch 30 = A and Ch 31 = B. LED indication 30 will indicate when transmitting message “Tx” and LED indication 31 will indicate when receiving message “Rx” to Connect-50.

Two external 120-ohm terminal resistor must be installed in each end of the RS485-bus.

7. Configuration

The settings covered by this chapter are settings that can be set directly on the unit. Some of these settings can also be set from the EmpirBus Studio PC software, and some settings needs to be set both in the PC software and on the unit. For further information, see the EmpirBus Studio documentation.

7.1 Bus ID

All units needs to have a unique bus ID. On the Connect-50 the bus ID can be read from the display on the upper left corner. Factory preset is bus ID 0 (000).

To change bus ID on a Connect-50 unit:

1. Press and hold RESET/AUTO for 10 seconds until the display shows “bAS”
2. Press MAN ON/MAN OFF three times. Display now alternates between the current bus ID and “bAS”.
3. Use the arrow buttons to set the desired bus ID.
4. Press and hold RESET/AUTO for 10 seconds until the DC module restarts.

7.2 Fuse reset

A channel with tripped fuse is in normal running mode indicated by a red continuous channel indicator. To reset the channel to normal operation:

1. Press the right arrow button. ”SEL” will be shown in the display.
2. Use the right arrow button to step to the desired channel.
3. Press and hold RESET/AUTO for two seconds. The fuse is now reset.
4. Press the left arrow until the message “SEL” in the display disappears.

Please note that if the problem that caused the fuse to trip still remains, the fuse will trip again.

7.3 Manual channel override

In case of bus failure there is failsafe functionality that allows channels to be manually switched on or off. For automatic bus failure backup settings, see the Enhanced Limp Home documentation.

A manually switched off channel is in normal running mode indicated by a flashing red channel indicator.
A manually switched on channel is in normal running mode indicated by a flashing green channel indicator.

7.3.1 Manual override switch off

1. Press the right arrow button. ”SEL” will be shown in the display.
2. Use the right arrow button to step to the desired channel.
3. Press and hold MAN ON/MAN OFF for two seconds
4. Press the left arrow until the message “SEL” in the display disappears.
5. Outputs manually switched off are now indicated with flashing red indication.

7.3.2 Manual override switch on

1. Press the right arrow button. ”SEL” will be shown in the display.
2. Use the right arrow button to step to the desired channel.
3. Press and hold MAN ON/MAN OFF for two seconds
4. If the channel indicator still is flashing red, again press and hold MAN ON/MAN OFF for two seconds
5. Press the left arrow until the message “SEL” in the display disappears.
6. Outputs manually switched on are now indicated with flashing green indication.

7.3.3 Resetting a channel

1. Press the right arrow button. ”SEL” will be shown in the display.
2. Use the right arrow button to step to the desired channel.
3. Press RESET/AUTO. The channel is now reset.
4. Press the left arrow until the message “SEL” in the display disappears.

8. Product specifications

See table 4.1 for model specification and hardware support

Output	
Fuse setting	1, 5, 8, 10 A
Output minus (-)	2 channels 6 A minus
Digital input	
12V power peak/average:	170mA / 1mA (closed), <0.1mA (open) Internal resistans = 14,85kohm
Signal Drive output	50mA positive/negative (se 6.1.8 for internal voltage drop)
Analog input	
Volt	0–18V +/-1%
Resistance	0–1500 ohm +/-5%
Communication	
CAN-bus	NMEA 2000
Optional CAN-bus	Galvanic isolated, configurable protocol
RS485	Galvanic isolated, configurable protocol
Power supply	
Maximum current	50A
Power consumption (power save)	1.5mA
Supply voltage (12V models)	9-16VDC
Connectors	
NMEA 2000	Micro 5pin M12 Male
Channels	Molex MX150L 16 circuits
Power supply	M6 bolt
Environment	
Ambient temperature	-20 to +70 degrees Celsius (dry)
Enclosure	Ingress Protection IP65, Polycarbonate[1]
Physical data	
Size	229 x 106 x 41 mm
Weight	0.4 kg

[1] Exposure to solvents and/or water above 60°C may cause cracking on polycarbonate.

2016-06-03

DECLARATION OF CONFORMITY

We, manufacturer, Trigentic AB, Bultvägen 1, S-45175 Uddevalla, Sweden, declare that the articles:

E70317, E70348, E70349

are in conformity with the EMC Directive,

Low Voltage Directive 2006/95/EC, EN60950

EMC Directive 2004/108/EC

CE MARK FIRST AFFIXED DATE

2nd June, 2016

We also declare that articles:

E70317, E70348, E70349

Comply with:

FCC 47 CFR Part 15, Subpart B, Class A

FCC MARK FIRST AFFIXED DATE

2nd June, 2016

SIGNS ON BEHALF OF:	Trigentic AB
Name:	Henrik Niklasson
Position:	Product & Sales Manager
Location and date:	Uddevalla, Sweden, 3d of June, 2016
Signature:	Henrik Niklasson

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2016-06-03

RoHS CERTIFICATE OF CONFORMANCE

We, manufacturer, Trigentic AB, Bultvägen 1, S-45175 Uddevalla, Sweden, declare that the articles:

2110110, 2110111, 2110112, 2110116, 2110117, 2120101, 2120102, 2120103, 2210101, 2210102, 2210103, 2210051

are in compliance with Directive 2002/95/EC on the restrict of the use in certain hazardous substances in mechanics, electrical and electronic equipment (RoHS Directives).

SIGNS ON BEHALF OF:	Trigentic AB
Name:	Henrik Niklasson
Position:	Product & Sales Manager
Location and date:	Uddevalla, Sweden, 3d of June, 2016
Signature:	Henrik Niklasson

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