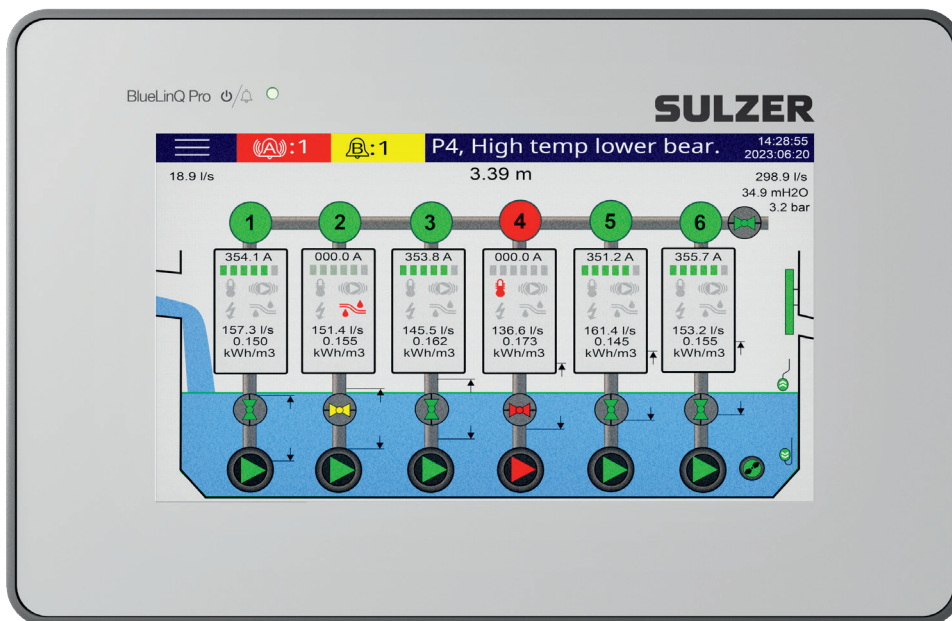


## BlueLinQ Pro controller (EC 541)



## **Installation Guide (Original instructions)**

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# 1 General information

**WARNING!** *This equipment must be installed, operated and maintained only by trained competent personnel and in accordance with all appropriate international, national and local standard codes of practice and site regulations for process connected apparatus and in accordance with the instructions contained here. Ensure that all power is off, and that all output devices to be connected to the controller also is turned off before you connect anything!*

The BlueLinQ Pro is a control system from Sulzer, designed mainly to be used in municipal wastewater pumping stations. It includes a built-in controller, a 7" resistive touchscreen and can be connected to a range of modules for monitoring and controlling any pump pit configuration.

The BlueLinQ Pro uses a single connector to communicate with and power the modules. The communication is a bus system and connects to a convenient DIN rail connector system. Up to 30 modules can be connected to the bus at one time.

The operator can easily configure and monitor the entire system from the touchscreen.

As well as the modules interface the BlueLinQ Pro is also equipped with additional interfaces to connect to external equipment.

- 1 RS232 port connects to modem, radio, or other serial communication carrier.
- 1 USB service port
- 1 com port for Modbus on TCP, RJ-45 ethernet
- 2 Modbus on RS485 (galvanically isolated)
- 1 micro SD interface for uploading/downloading updates or data.
- 4 digital inputs
- 4 digital outputs
- 1 input power connection

## 2. Physical installation

The BlueLinQ Pro comes with 4 clamps including screws, for panel mounting. A panel cut-out of 208 x 128 mm is required, see Figure 1. The BlueLinQ Pro is placed through the cut-out and the 4 corner clamps are tightened sufficiently to retain the BlueLinQ Pro in the panel.

The BlueLinQ Pro is suitable for outdoor use and should be installed in an end enclosure which has a suitable rating. Front panel IP65, meets the requirement of type 4 rating. Rear panel IP20, needs to be installed in a final enclosure which has a suitable type rating.

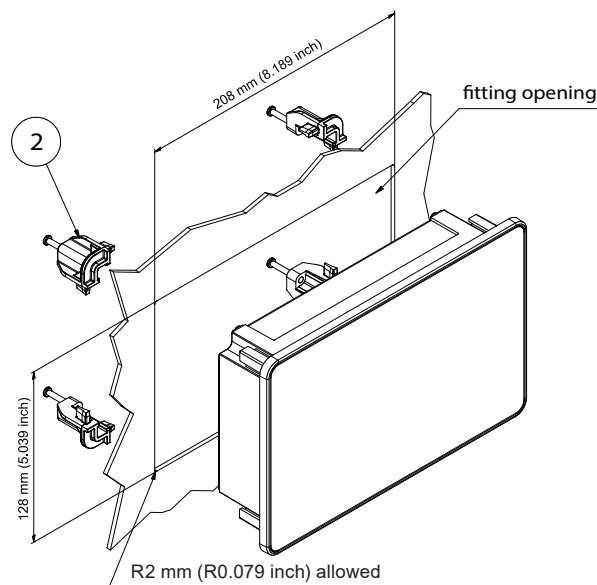


Figure 1

## 3. Interfaces

### 3.1. Power port

The BlueLinQ Pro is powered from a two-port connection, see Figure 4 and Table 1 below. W1 (V+) is the positive power to the BlueLinQ Pro and Pin2 (V-) is the return. The BlueLinQ Pro is supplied with a removable screw terminal connector, suitable sized single stranded wire is to be used<sup>1</sup>.

Use a power supply of 10 to 30 VDC which has a suitable power rating to supply the BlueLinQ Pro. The BlueLinQ Pro with no digital output load or modules connected consumes less than 6 Watts. It is recommended that a suitably rated fuse is used to prevent power supply overload.

When power is applied the touchscreen should illuminate and the controller will go through initialisation for a few seconds after that the BlueLinQ Pro is ready to use.

### 3.2. Field bus and power port

The BlueLinQ Pro communicates and powers a range of modules for monitoring and controlling. This is achieved using a five-port connection, see Figure 4 and Table 1 below. Pin3 (P+) is the positive power to the modules and Pin7 (P-) is the return, suitable sized single stranded wire is to be used<sup>1</sup>.

Pin4 (D-) and Pin6 (D+) are the differential communication lines and Pin5 (SCN) is used for shielding, two core shielded twisted pair is used for communication. All three connections D-, D+ and SCN must be made to ensure reliable communication.

The termination jumper, Term1, is populated by default. If the unit is at either end of the communication network, then the jumper must be populated, otherwise remove, see Figure 4.

### 3.3. Digital output ports

The BlueLinQ Pro is supplied with 4 Digital Out ports, these are accessed via a five-port connection, see Figure 2 and Table 1 below. Pin8 (Vdo) is power in for the ports, in the range of 10 VDC to 30 VDC with a maximum total load of 4 A. The return for the supply connected to Vdo must be connected with V- (return of BlueLinQ Pro supply). Pin9 to Pin12 are the digital outputs DO1 to DO4. When connecting use suitable sized single stranded wire is to be used<sup>1</sup>. The digital outputs have a voltage out of Vdo with a maximum total load of 4 A for all outputs and a maximum current rating of 1.7 A per output.

**Note:** *The return of the supply connected to Vdo needs to be connected with the return of the supply of the BlueLinQ Pro (V-). See figure 2 below.*

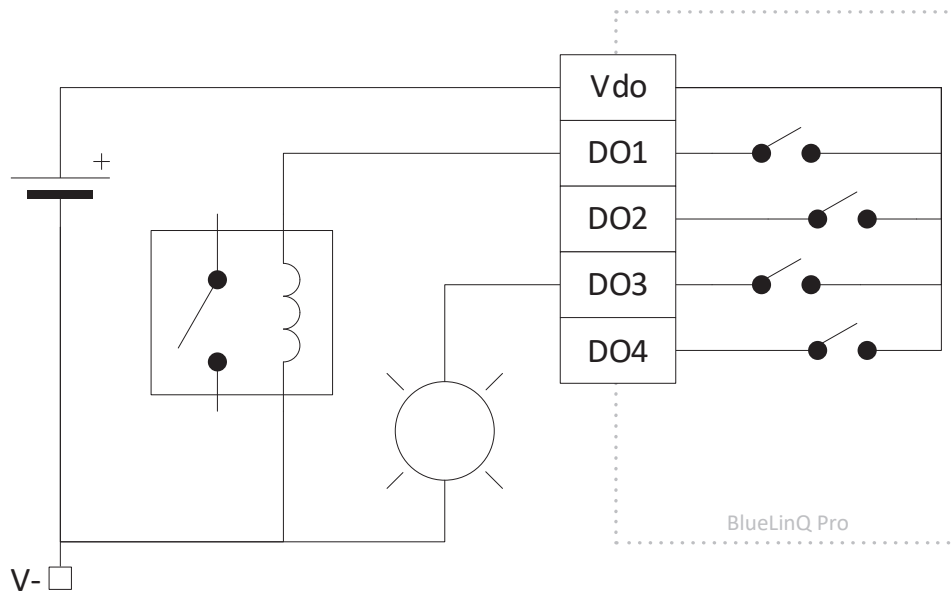


Figure 2 Typical Digital output connections

<sup>1</sup> The connection will accept wires in the range of 16 to 26 (AWG), but it is recommended that you use the wire to support the current loads required, if in doubt use 16 AWG. If wiring directly strip the wire to 6, up to 7mm, if using bootlace terminals use the manufacturer recommendations.

### 3.4. Digital input ports

The BlueLinQ Pro is supplied with 4 digital in ports, these are accessed via a five-port connection, see Figure 4 and Table 1 below. Pin13 to Pin16 are digital inputs DI1 to DI4 and Pin17 (Vdi) is a current limited (200 mA) output equivalent to V+. When connecting use suitable sized single stranded wire. The Digital inputs have a voltage range of 0–30 VDC with a trigger level of  $\approx 4$  VDC, the input resistance is 1.8 k $\Omega$ . The Digital inputs can be configured to accept pulse channels up to 1kHz.

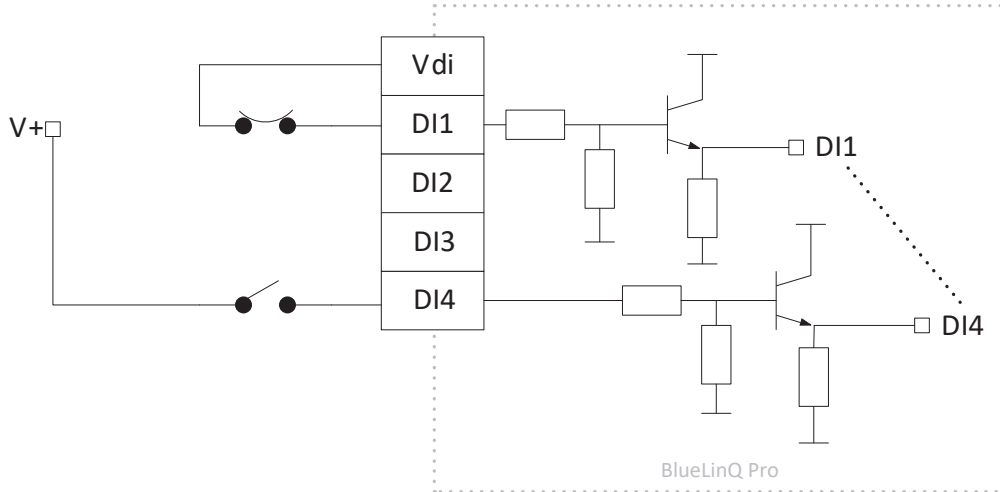


Figure 3 Typical Digital input connections

### 3.5. RS232 port

The BlueLinQ Pro has an RS232 port which is designed for modem communication and uses Modbus RTU protocol, see Figure 5 and Table 2. Pin22 (RTS) is the Request To Send, Pin21 (CTS) is the Clear To Send, Pin20 (TX) is the Transmit, Pin19 (RX) is the Receive and Pin18 (V-) is the ground reference. When connecting use suitable sized single stranded wire for the connections<sup>1</sup>. If operating in an electrically noisy environment a shielded cable is recommended. The port supports standard baud rates from 300 to 230400 and has option to include parity check.

### 3.6. RS485 ports

This BlueLinQ Pro has two isolated RS485 ports and uses Modbus RTU protocol, see Figure 5 and Table 2. Pin23 and Pin24 are the differential communication lines and Pin25 is used for shielding for RS485\_1. Pin26 and Pin27 are the differential communication lines and Pin28 is used for shielding for RS485\_2. Use two core shielded twisted pair with suitable sized wire<sup>1</sup>.

The communication termination jumpers, Term2 for RS485\_1 and Term3 for RS485\_2, are populated by default. If the unit is at either end of the communication network, then the jumper must be populated, otherwise remove, see Figure 5.

Also, on each RS485 port is the option for biasing. This is to make sure that the RS485 line remains in a known non-fluctuating state when no devices are transmitting. A 1.1 k $\Omega$  pull-up resistor is attached to the “+” signal line, and a 1.1 k $\Omega$  pull-down resistor is attached to the “-” signal line, these are populated by default.

### 3.7. USB service port

The BlueLinQ Pro USB service port supports USB2.0 and is of Mini-B connection type, see Figure 4 and Table 1 below. It is primarily used to download configuration information and updating firmware using AquaProg. The port supports Modbus RTU and Modbus ID in settings. When connecting the BlueLinQ Pro via USB to a PC for the first time a driver appears, just follow the instructions on your PC.

### 3.8. RJ45 ethernet port

The BlueLinQ Pro supports an ethernet port on a standard RJ45 connection, see Figure 5 and Table 2 below. In the settings, the user can select between static or dynamic IP-address. By default, the Modbus TCP port is 502.

### 3.9. MicroSD memory slot

The BlueLinQ Pro has a slot for a MicroSD memory card of push-push ejector type, see Figure 5 and Table 2 below. It is primarily used to download configuration information, updating firmware and data.

### 3.10. Reset

The BlueLinQ Pro reset button is accessed through a small hole, see figure 5 below. To activate place a straightened paperclip or similar into the hole and hold for 10 seconds, this will restore the unit's configuration to factory default.

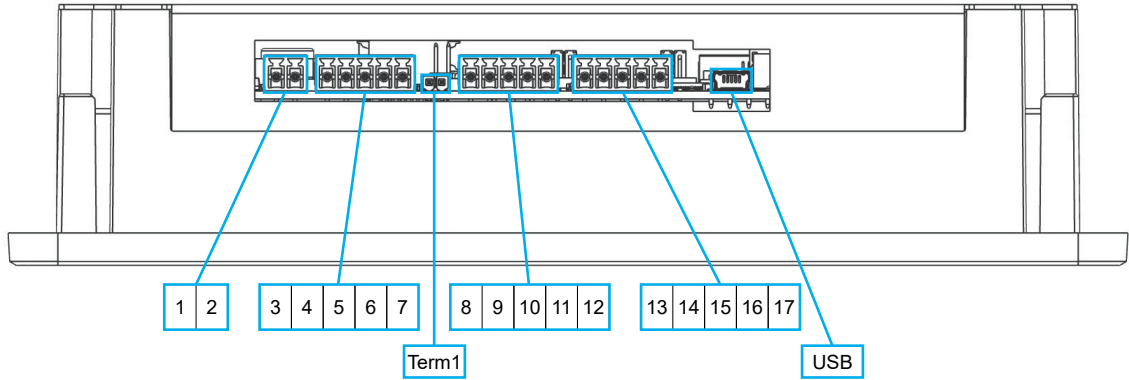


Figure 4

|      | POWER |    | FIELD BUS & POWER |    |     |    |    | DIGITAL OUT |     |     |     |     | DIGITAL IN |     |     |     |     |
|------|-------|----|-------------------|----|-----|----|----|-------------|-----|-----|-----|-----|------------|-----|-----|-----|-----|
| Pin  | 1     | 2  | 3                 | 4  | 5   | 6  | 7  | 8           | 9   | 10  | 11  | 12  | 13         | 14  | 15  | 16  | 17  |
| Name | V+    | V- | P+                | D- | SCN | D+ | P- | Vdo         | DO1 | DO2 | DO3 | DO4 | DI1        | DI2 | DI3 | DI4 | Vdi |

Table 1

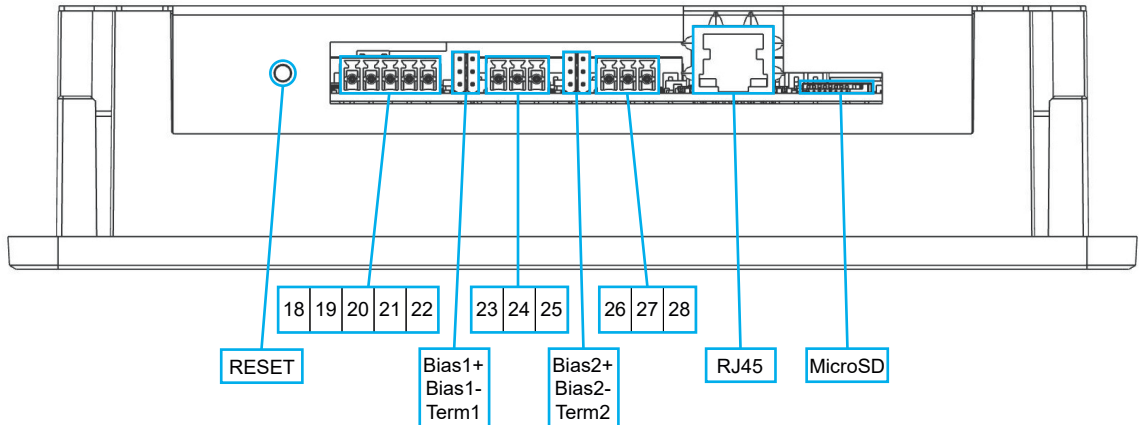


Figure 5

|      | RS232 |    |    |     |     | RS485/1 |      |      | RS485/2 |      |      |
|------|-------|----|----|-----|-----|---------|------|------|---------|------|------|
| Pin  | 18    | 19 | 20 | 21  | 22  | 23      | 24   | 25   | 26      | 27   | 28   |
| Name | V-    | RX | TX | RTS | CTS | D+/1    | D-/1 | Ref1 | D+/2    | D-/2 | Ref2 |

Table 2

## 4. Powering up

### 4.1. Powering BlueLinQ Pro

Connect a suitable power supply to pins 1 and 2 of the BlueLinQ Pro<sup>1</sup> as described in section 3.1. When powering up for the first time it is recommended to set the date and time to ensure any events/alarms are correctly timed and dated.

If on power up the touchscreen is unresponsive a recalibration can be done in two ways:






1. Go to Main Menu/Settings/System/Graphical display/Calibrate touch screen, and move the slider to YES, and follow the onscreen instructions. Note: A password is required to enter this menu.
2. Before powering up the unit, maintain a touch on the screen and then apply power, this will automatically take the user to the Calibrate touch screen menu and follow the onscreen instructions. Note: A password is not required to enter this menu.

### 4.2. Powering modules

Connect suitable wiring to pins 3, 4, 5, 6 and 7 of the BlueLinQ Pro<sup>1</sup> as described in section 3.2 and in the Modules Installation Guide. Ensure Term 1 has a jumper populated.

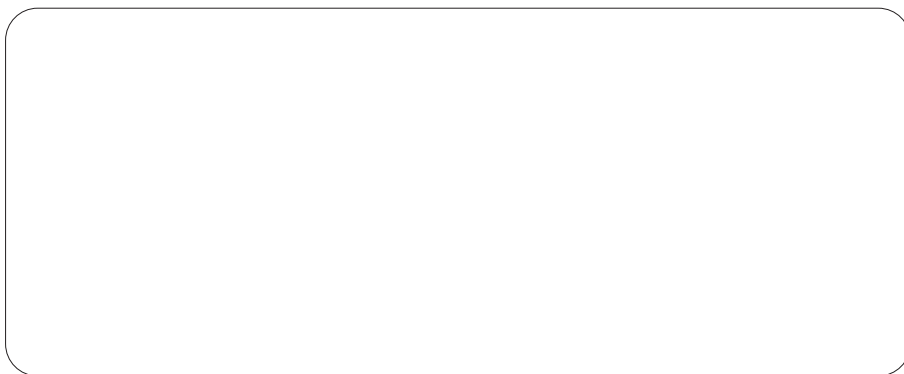
**Attention: The modules are not hot swappable, when adding or removing modules remove power first.**

## 5. Table of specifications for BlueLinQ Pro

| Description                           |  |
|---------------------------------------|--|
| Ambient operation temperature         | -20 to +50 °C (-4 to +122 °F)  |
| Ambient storage temperature           | -30 to +80 °C (-22 to +176 °F)   |
| Mounting                              | Panel Mounted. Cut-out of 208 x 128 mm (8.189 x 5.039 inch)  |
| Degree of protection                  | Front Panel: IP65<br>Rear Panel: IP20  |
| Housing material                      | Frame: PC UL 94 V0<br>Rear Hood: Galvanised sheet steel  |
| Dimension                             | H x W x D: 146 x 226 x 52.5 mm (5.75 x 8.90 x 2.07 inch)   |
| Humidity                              | 0-95 % RH non-condensing   |
| Power supply                          | 10-30 VDC, Device is supplied by Class 2, SELV, Limited Energy Source.   |
| Power consumption standalone          | < 6.0 W  |
| Power consumption max. load           | < 112 W (30 modules attached)  |
| Installation category                 | CAT I  |
| Digital outputs                       | 4 Outputs, Positive logic, Sourcing from power Vdo (Pin8),<br>1.7 A/output, Total Load 4 A.  |
| Digital inputs                        | 4 inputs, 1.8 kΩ input resistance, 0-30 V input voltage, 4 V ≈ trig level,<br>1 kHz max. pulse rate  |
| Communication Ports                   | 1 USB 2.0 service port<br>1 RS232 port for telemetry interface (modem)<br>2 Modbus on RS485 (galvanically isolated)<br>1 ethernet port for Modbus TCP  |
| Memory                                | 1 micro SD interface for uploading/downloading updates or data.  |
| Field Bus (to CA 811/CA 821.....etc.) | 1 CAN FD Port. Max current load 6 A  |
| Max. Altitude                         | 2000 m (6560 ft)   |
| Approvals                             |      |







**SULZER**

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