
Installation Manual

Marine Pro.

200E Series

DCU 210E/208E – Engine Panel

RP 210E/220E – Remote Panel



auto MASKIN

Installation Manual

for the

Marine Pro 200E Series

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**DCU 210E/208E** Diesel Engine Control Unit

**RP 210E/220E** Remote Panel

Revision            1.5  
Revised            January 23, 2017

### Revision history:

| Rev. | Date       | Description                                      |
|------|------------|--------------------------------------------------|
| 1.0  | 2.9.2015   | Initial release.                                 |
| 1.1  | 4.9.2015   | Corrected thermistor terminals on page 6.        |
| 1.2  | 9.2.2016   | Updated the connector pinout description page 6. |
| 1.3  | 15.2.2016  | Added connections drawing page 12.               |
| 1.4  | 18.3.2016  | Thermistor 2, 3 and 4-wire drawings.             |
| 1.5  | 25.11.2016 | RP 220E added.                                   |

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## Document Information

### About this manual

This manual has been published primarily for professionals and qualified personnel.

The user of this material is assumed to have basic knowledge in marine systems, and must be able to carry out related electrical work.

Work on the low-voltage circuit should only be carried out by qualified and experienced personnel.

Installation or work on the shore power equipment *must only* be carried out by electricians authorized to work with such installations.

#### Responsibilities

It is the *sole responsibility of the installer* to ensure that the installation work is carried out in a satisfactorily manner, that it is operationally in good order, that the approved material and accessories are used and that the installation meet all applicable rules and regulations.

**Note!** Auto-Maskin continuously upgrades its products and reserves the right to make changes and improvements without prior notice.

All information in this manual is based upon information at the time of printing.

For updated information, please contact your local distributor.

Installation Manual – 200E Series

## Matching firmware

This Installation Manual is for the 200E Series of panels.

It has been updated to match the following firmware releases.

| Panel          | Firmw. | Release      |
|----------------|--------|--------------|
| DCU 210E/ 208E | 3.5 P2 | January 2017 |
| RP 210E/220E   | 3.5 P2 | January 2017 |

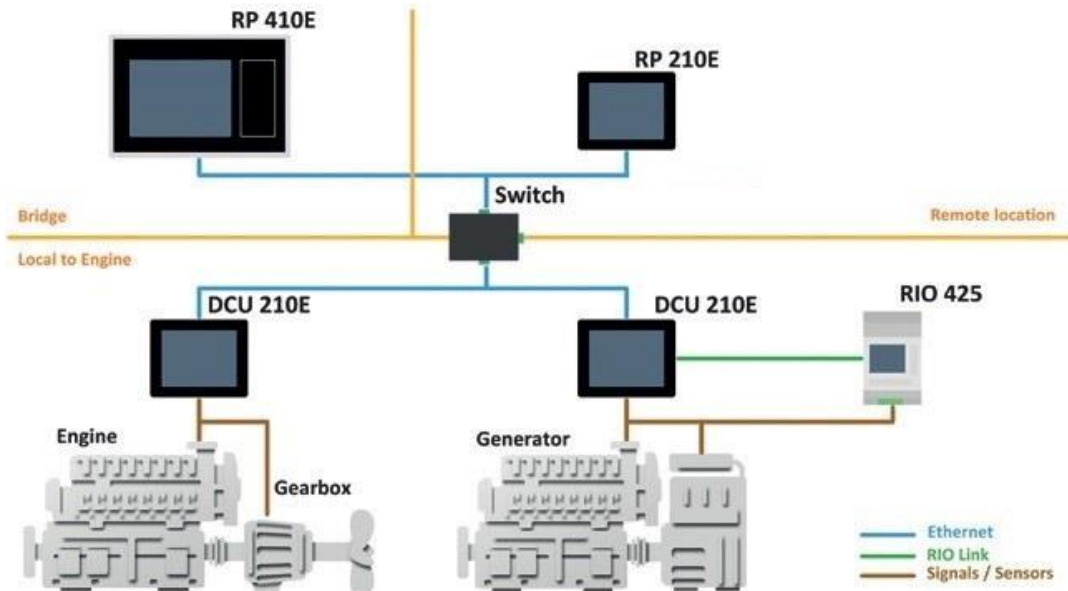
## Ordering information

The Marine Pro covers a wide range of compatible products within both the 200- and 400 Series. Please visit our web site for more information.

<http://auto-maskin.com/marine/>

## Overview of the 200 series

The drawing below shows a typical layout.



### DCU 210E Engine Panel

The DCU 210E engine panel is the main building block in the 200 Series. Engine sensor values are displayed on the color touch screen, and commands and other user interaction is also here.

### DCU 208E Engine Panel

The DCU 208E is basically the same as the DCU 210E, but without the color touch screen.

It saves cost being used in smaller engine rooms, where a remote panel is all that is needed.

### Configuration

An ordinary PC web-browser is used to configure the DCU, using the inbuilt web-server on the DCU.

### RP 210E/220E Remote Panel

The optional RP remote panel brings everything on the DCU to a remote location, with the exact same user interface. It does not need any configuration, as it is reading the configuration from the DCU.

As such, the RP can easily be retrofitted.

The RP also supports one IP-camera to be installed on the network.

## Ethernet Switch

The Ethernet switch is not necessary if only one DCU 210E and one RP 210E/220E is in use. These can then be wired with an Ethernet cable directly.

It is recommended to make use of an Ethernet switch though, as it simplifies PC configuration connection and future expansion to remote panels and/or camera interface.

## Expansion

The basic system can be expanded with more input and output channels using the versatile RIO units (Remote I/O).

Currently, there are RIO units for

- I/O expansion, RIO 410 and RIO 210.
- Exhaust temperature monitoring, RIO 412
- Generator monitoring, RIO 425
- Load sharing, LSU 408

## Installation

Installation covers panel location, wiring and first power-on.

### Panel location

This section gives basic guidelines for installing the different panels.

#### DCU 210E

The panel is normally located in the engine room for a number of reasons.



The main reasons are:

- Local operation and overview.
- Minimize cabling requirements and cost from sensors to panel.
- Reduce of electrical noise levels resulting from long cables.

#### DCU 208E

This panel is also normally installed in the engine room, close to the engine.

Unlike the DCU 210E and the RP 210E/220E the DCU 208E is installed on a din-rail.

The panel does not have a user interface and is normally used in unmanned engine rooms.

A RP 210E/220E remote panel is used to bring the signals from the engine room to a monitoring site, e.g. bridge or wheelhouse.

#### RP 210E/220E

The RP remote panel is normally located at a remote place away from the engine room, but it can also be used in the engine room.

#### Compatible panel series

Note that the 200 series panel can be used together with the 400 series panels.

For instance can a RP 210E/220E remote panel be used to monitor a DCU 410 engine panel.

#### General

Panels with a screen should be mounted at about eye level and the user should have easy access to operate the panel.

Ensure easy access to the rear wiring.

The panel may be mounted on the engines supporting structure provided shock absorbers are used either between the structure and the engine, or between the structure and the panel enclosure.

## Panel Cut-out

The DCU and RP cut-out size is:

- 153mm width, 123 mm height

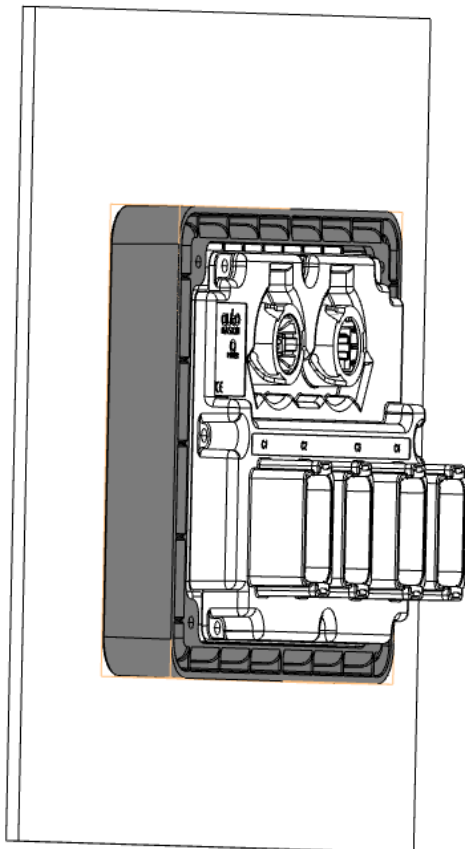
## Mounting bracket

### DCU 210E and RP 210E/220E

When installing the panel make sure to use the bundled screws and mounting bracket.

If installing the panel on a thicker surface than 5mm, longer flanged screws must be used. In this case M3 16mm flanged screws is recommended.

Make sure that the screws are not too long, as this will damage the panel.

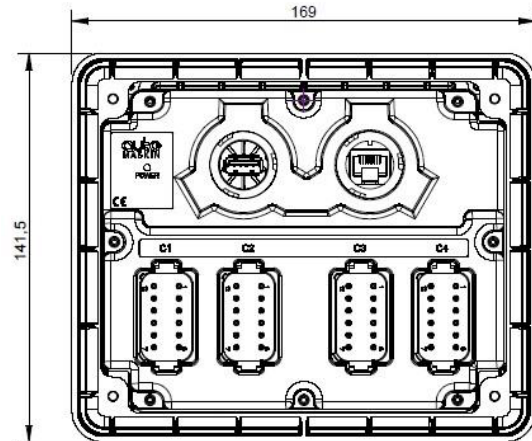


*The DCU 210E / RP 210E installed with the mounting bracket shown in grey.*

## Connectors

### DCU 210E, DCU 208E, RP 210E and RP 220E

These are the connectors on the DCU and RP back lid.



*The DCU 208E front view is the same as the DCU 210E rear view.*

## Connector kit

The 200E series is not shipped with mating connectors.

A complete kit is available containing all of the mating terminal blocks used on the 200 E series.

Kit 1006479 contains:

- 4 Deutsch DT series connectors (DT06-12SA).
- 50 hand crimp sockets 0.5 –1.0 mm<sup>2</sup> (16–20 AWG).
- 10 hand crimp sockets 1.0 –2.0 mm<sup>2</sup> (14–16 AWG).
- 50 sealing plugs for unused terminals.

A crimp tool is necessary for proper crimping of the mating terminals. Use Deutsch HDT-48-00 crimping tool.



Connector pinout –  
DCU 210E and 208E

The table below shows the connector pinout on the DCU panels.

The connector is described as e.g. C1P2. Where 1 is the connector number and 2 is the pin number.

See [Appendix A](#) to see typical sensor connections DCU 210E.

| Power Supply                         |                                      |        |
|--------------------------------------|--------------------------------------|--------|
| C1P11                                | +12/24VDC Primary Supply             | In/Out |
| C1P12                                | 0V Primary Supply                    | In     |
| C1P3                                 | Ground connection                    | In     |
| RIO Link Interface                   |                                      |        |
| C1P5                                 | Low                                  | In     |
| C1P6                                 | High                                 | In     |
| CAN J1939 Engine Interface           |                                      |        |
| C1P7                                 | CAN 1 High                           | In     |
| C1P8                                 | CAN 1 Low                            | In     |
| C1P9                                 | CAN 1 Shield                         | In     |
| C2P10                                | CAN 2 High – (I/O #20 <sup>3</sup> ) | In     |
| C2P11                                | CAN 2 Low – (I/O #21 <sup>3</sup> )  | In     |
| C2P12                                | CAN 2 Shield – (I/O #5)              | In     |
| All Faults Relay (Inactive on fault) |                                      |        |
| C2P1                                 | NC                                   | –      |
| C2P2                                 | Common                               | –      |
| C2P3                                 | NO                                   | –      |
| On Board Relay #1                    |                                      |        |
| C2P4                                 | NC                                   | –      |
| C2P5                                 | Common                               | –      |
| C2P6                                 | NO                                   | –      |
| On Board Relay #2                    |                                      |        |
| C2P7                                 | NC                                   | –      |
| C2P8                                 | Common                               | –      |
| C2P9                                 | NO                                   | –      |
| Magnetic Pickup                      |                                      |        |
| C4P1                                 | A                                    | In     |

| C4P2               | B – (I/O #18 <sup>1</sup> )        | In     |
|--------------------|------------------------------------|--------|
| Modbus RTU, RS-485 |                                    |        |
| C4P3               | Shield                             | In     |
| C4P4               | Low                                | In     |
| C4P5               | High                               | In     |
| Thermistor Input   |                                    |        |
| C4P6               | Thermistor #1 A                    | In     |
| C4P7               | Thermistor #1 B                    | In     |
| C4P8               | Thermistor #1 C                    | In     |
| C4P9               | Thermistor #2 A                    | In     |
| C4P10              | Thermistor #2 B                    | In     |
| C4P11              | Thermistor #2 C                    | In     |
| Flexible I/O       |                                    |        |
| C1P1               | I/O #1                             | In/Out |
| C1P2               | I/O #2 <sup>1</sup>                | In/Out |
| C1P4               | I/O #3                             | In/Out |
| C1P10              | I/O #4                             | In/Out |
| C2P12              | I/O #5 <sup>1</sup>                | In/Out |
| C3P1               | I/O #6 <sup>2</sup> / Sensor Power | In/Out |
| C3P2               | I/O #7                             | In/Out |
| C3P3               | I/O #8                             | In/Out |
| C3P4               | I/O #9                             | In/Out |
| C3P5               | I/O #10                            | In/Out |
| C3P6               | I/O #11                            | In/Out |
| C3P7               | I/O #12 <sup>1</sup>               | In/Out |
| C3P8               | I/O #13                            | In/Out |
| C3P9               | I/O #14                            | In/Out |
| C3P10              | I/O #15                            | In/Out |
| C3P11              | I/O #16                            | In/Out |
| C3P12              | I/O #17                            | In/Out |
| C4P2               | I/O #18 <sup>1</sup>               | In/Out |
| C4P12              | I/O #19                            | In/Out |

<sup>1</sup>Configurable as flexible I/O or as a 0V reference.

<sup>2</sup>Configurable as flexible I/O or supply for 0–5V sensors.

<sup>3</sup>Alternative I/O function is digital input only.

Connector pinout –  
RP 210E/220E

The table below shows the connector pinout on the RP panel.

The connector is described as e.g. C1P2. Where 1 is the connector number and 2 is the pin number.

| <b>Power Supply</b>                         |                          |        |
|---------------------------------------------|--------------------------|--------|
| C1P11                                       | +12/24VDC Primary Supply | In/Out |
| C1P12                                       | 0V Primary Supply        | In     |
| C1P3                                        | Ground connection        | In     |
| <b>Switch Input</b>                         |                          |        |
| C1P1                                        | Switch Input #1          | In     |
| C1P2                                        | Switch Input #2          | In     |
| C1P4                                        | Switch Input #3          | In     |
| <b>All Faults Relay (Inactive on fault)</b> |                          |        |
| C2P1                                        | NC                       | -      |
| C2P2                                        | Common                   | -      |
| C2P3                                        | NO                       | -      |

## Wiring Connections

The following chapter primarily assumes a DCU panel.

If installing an RP, then just disregard descriptions that is not described in the table “Connector Pinout RP 210E/220E”.

### General

To protect against EMC noise, we recommend that all cables are shielded.

**Note!** The shield of all cables shall be connected to ground/hull, *not* to 0V!

For good electrical noise separation, consider routing some cables separate from other cables – for instance the pickup signal cable.

**Note!** Connect shield in one end of the cable only.

### Grounding

In marine installations, ground and 0V volt should not be connected together. In a ship installation, the hull is the “ground” whilst the battery minus is the 0V.

In the DCU system, +12/24V and 0V are filtered to ground using special filter components. This is done to reduce electrical noise entering the system.

**Note!** Please keep ground and 0V separated!

If ground and 0V is connected, these filters do not work properly.

### Power Supply [C1P11 – C1P12]

The 200E Series is designed to run on either 12 VDC or 24 VDC supply voltage.

**Note!** Make sure the supply power is sourced directly from the battery, and *not* from the starter engine, as the voltage drop over the latter is significant.

## Power Supply Requirements

The panel must be sourced with an 8–32VDC supply. This is the “full functionality” range.

### General

Use a cable with twisted pair wires to minimize the effect of noise on the supply input.

Connect the cable straight from the battery and keep the cable as short as possible.

Use at least 1.0mm<sup>2</sup> (17 AWG) wires for the power supply.

### 12 V supply

If the supply voltage is in the range 8–16V, then the panel automatically assumes it is on a 12 VDC system.

### 24 V supply

If the supply voltage is in the range 16–32 V, then the panel automatically assumes it is on a 24 VDC system.

## Alarm for Low Power Supply

The input voltage is monitored with fixed set points. The set points are as follows:

## 24 V supply

- Warning: <21 V
- Alarm: <18 V

## 12 V supply

- Warning: <11 V
- Alarm: <10 V

The persistence timer is fixed for all set points at 30 sec before a warning or an alarm.

RIO Link [C1P5 - C1P6]

## DCU 210E and 208E

This is the link for the optional expansion units RIO 210, RIO 410, RIO 425 and LSU 410.

Shield the cable in the RIO end only.

## RP 210E/220E

On these panels, the RIO link is used for the optional ambient light sensor ALS 210, which provides automatic adjustment of the backlight intensity.

J1939 CANbus [C1P7 - C1P9 and C2P10 - C2P11]

Engine J1939 CANbus interface for connection to the engine ECM, electronic control module.

All Faults Relay [C2P1 - C2P3]

Note that the relay is activated when there are no faults, and deactivates for any fault.

A “fault” is defined as any new instance in the alarm list, except diagnostic messages graded white.

The relay has a 1 A over-current protection on the common pin.

Relay #1 [C2P4 - C2P6]

This relay can be configured to activate for any inbuilt function. See the configuration manual.

The relay has a 1 A over-current protection on the common pin.

Relay #2 [C2P7 - C2P9]

This relay can be configured to activate for any inbuilt function. See the configuration manual.

The relay has a 1 A over-current protection on the common pin.

Magnetic Pickup, MPU [C4P1 - C4P2]

The engine speed pickup is connected here.

Pickup must be of Magnetic (sine-wave) or digital (square-wave) type.

Frequency range: 100 HZ - 10 KHz.

Amplitude range: 2V<sub>p-p</sub> - 30V<sub>p-p</sub>

Shield the cable at the pickup end only.

Modbus RS-485 [C4P3 - C4P5]

The DCU has an inbuilt Modbus™ interface, both on RS-485 and also on Ethernet. The latter is known as Modbus TCP.

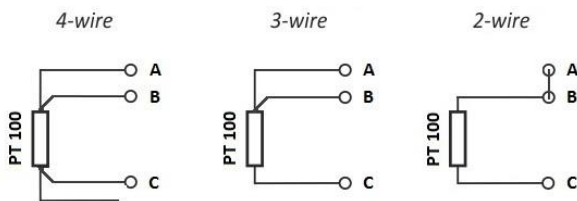
Addressing wise, these are equal, and the complete I/O list is available online here:

[https://spreadsheets0.google.com/ccc?key=pXw4WK\\_Vh9Fd5kKQykjrVQA&hl=en#gid=13](https://spreadsheets0.google.com/ccc?key=pXw4WK_Vh9Fd5kKQykjrVQA&hl=en#gid=13)

## Thermistor Input [C4P6 - C4P11]

There are two thermistor input channels on the DCU.

The channels support sensors with two, three or four wires. See figure below for recommended wiring options.



Measurement range is 95 - 60k ohm.

Detectable failure modes:

- Broken wire between A/B and C
- Short circuit between A/B and C.

## Flexible I/O [I/O #1 - I/O #19]

There are nineteen Flexible I/O channels on the DCU.

Each channel can be configured for different use as described below.

### Power Output

All flexible I/O can be configured as 12V 0,2A or 24V 0,2A power outputs with short circuit detection and protection.

### Switched Output

All flexible I/O can be configured as configurable 12/24V outputs on the DCU.

Each channel can be configured for any available function.

### 4-20mA Input

All flexible I/O can be configured as 4-20 mA analog sensor inputs on the DCU.

If the signal is out of range, a warning will be displayed.

Out of range is defined as:

- < 2 mA (broken wire)
- > 22 mA (short circuit)

Note that the internal impedance is 50Ω.

### Switched Input

All flexible I/O can be configured as 12/24 V input channels.

Each channel can be configured as an engine switch, e.g. Oil Pressure Low switch, or it can be configured to activate an inbuilt function, eg. Automatic Start.

Use the power supply voltage from C1P11 or a configurable I/O set to power output to power the switch inputs.

See the Configuration manual for more information.

## Other Interfaces

### Ethernet MODBUS/TCP

The DCU connects to a LAN (Local Area Network) or directly to a PC through a standard CAT-5 network cable connected to the RJ45 port.

The IP address in the DCU and/or the local PC may need to be changed in order to access the DCU configuration from a PC.

### USB Memory Interface

This interface is used for two purposes:

- Update of the current configuration file (not RP panels).
- Update the panel firmware (all panels)

Copy a valid configuration and/or firmware file to a USB memory stick, and insert the USB memory stick in the panel.

Follow the instructions that will be appearing on the screen.

## First Power-On

### Preparations

First, make sure to consult the Quick Installation Guide (QIG) that came with the panel.

## Installation

Install the panel according to guidelines in the QIG.

## Connections

Connect power to the panel according to guidelines in the QIG.

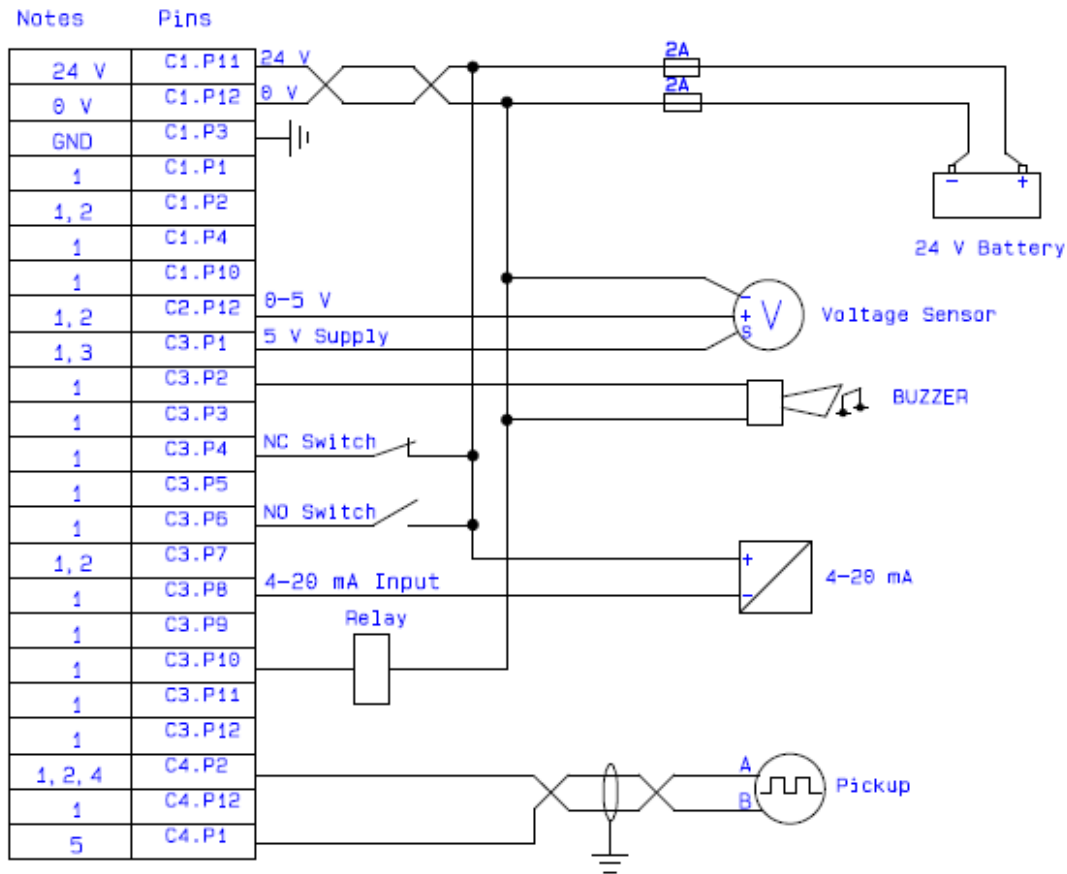
### First Power-On Wizard

The DCU (not DCU 208E) will display the *first power-on wizard* at the first power up after delivery, or after a factory reset of the panel.

All wizard settings can be changed later.

## Appendix A

Typical sensor connections DCU 210E



### Notes

1. Configurable as flexible I/O:  
24V Out, Switch Input, User Config Output,  
4-20 mA & Voltage Sensor.

2. 0 V reference.

3. 5 V Supply for 0-5 V sensors.

4. Pickup (A) 0 V.

5. Pickup (B).

There are four Deutsch DT connectors,  
with 12 pins in each connector.

E.g C3.P8 is connector 3, pin 8.