



# ***CSQ-Visual***

Version with CSQVIO7 card

## **Installation manual**

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# 1 Installing *CSQ-Visual*

This paragraph describes the operations necessary to fit and connect the *CSQ-Visual* to the machine and make it operative.

The *CSQ-Visual* has been designed to be independent: all you have to do is connect the valves and sensors that will be powered by the instrument. Naturally there's nothing to stop you from combined use with a PLC.

To operate, the *CSQ-Visual* requires different input and output signals. As regards the inputs, a force transducer (load cell), a position transducer (incremental encoder, potentiometer or 0-10 V transducer) and various sensors are required. The outputs are connected to the unit descent enabling valve, the protection closure valve (where installed) and the warning lights.

## 1.1 Important notes for installation



This manual refers only to the instrument with expansion card CSQVIO6.



The *CSQ-Visual* has to be powered at 24VDC. An optional internal power feeder is available, enabling direct connection to the mains power.



This instrument is not (and could not be) a safety device: the descent of the press must be entrusted to elements outside the instrument. The instrument synchronises the descent of the press in order for it to work.



It is very important for the load cell wire terminal, which is not sheathed, to be as short as possible.



When the machine has electric motors, these must be equipped with an anti-interference filter and be controlled using semiconductor devices.



Always connect the container of the instrument to the earth conductor.

## 1.2 Operating of the instrument

**Attention: the *CSQ-Visual* is not (and could not be) a safety device: the descent of the press must be entrusted to external elements. The *CSQ-Visual* synchronises the descent for its operation. The GO Output is usually connected serially to the chain of the cylinder descent. In short, if the *CSQ-Visual* activates the GO enabling output, the cylinder must not descend if it is not safe.**

Operation takes place as follows: when the START input is activated by an external command, the *CSQ-Visual*, if ready, activates the protection descent output (PROTECTION) where present and enables the cylinder descent (GO). When the protection is closed, a safety device must activate the cylinder until the *CSQ-Visual* removes the cylinder descent enabling signal (GO). The *CSQ-Visual* then commands the arrest of the press, removing the GO signal, controls the curve until the force begins to diminish or is activated by way of the T.D.C. input (withdraw cylinder signal). Only then does it indicate whether or not the piece is good or a reject.

If the piece is good, the GOOD output is activated and the PROTECTION output, where present, is deactivated. If the piece is a reject, the REJECTED output is activated intermittently and the PROTECTION output, where present, is left active. When the operator presses the reset button, which can be external or always active, the instrument maintains the REJECTED output as fixed and removes the PROTECTION output.

The correct alignment of the encoder takes place using its zero notch and the T.D.C. withdraw cylinder signal.

### 1.3 Internal cards

There are two cards inside the *CSQ-Visual*:

**frontal** supports the display, keyboard and main CPU.

**input e output** for the connection of input signals, output signals and transducers.

We make all the cards ourselves and they can be altered to suit your specific requirements.

### 1.4 Electric wiring

The following information explains how to install the electric wiring.

#### 1.4.1 Information for connection to an external controller (PLC)

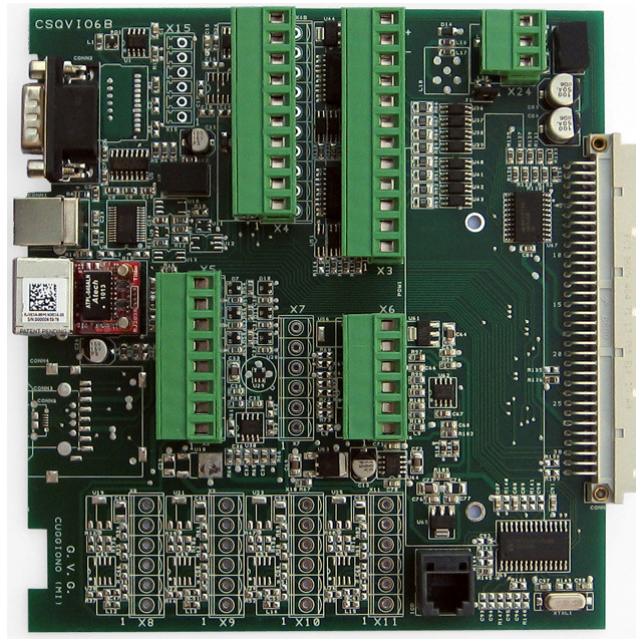
To connect the *CSQ-Visual* to a PLC, the latter must have PNP positive logic. The inputs and outputs of the instrument are optoinsulated from the instrument's control electronics. The power supply of the instrument's inputs and outputs must be the same that powers the inputs and outputs of the PLC. We recommend the use of at least one output (START signal) and three inputs of the PLC (GO, GOOD and REJECTED). If necessary, with the press controlled directly by the instrument, it is possible to use a single input to know whether the piece is good (GOOD output) and a single output to control the start of the pressing cycle (START input).

Remember that, in all cases, it is always necessary too connect the T.D.C. input of the *CSQ-Visual*. The T.D.C. signal can be acquired directly by a limit switch activated with the press in the resting position. However, the signal indicating that the press is in the resting position is almost always used by the PLC. In this case the signal to be given to the instrument may be taken parallel to that delivered to the PLC.

#### 1.4.2 CSQVIO7 card wiring

*Attention: this information refers only to the CSQVIO7 card. Check that the correct type of card is fitted.*

The wiring is supported by removable terminal blocks (X3, X4, X5...). Every terminal on every terminal block is numbered. For example, when terminal X5.7 is indicated, reference is made to the seventh terminal of terminal block X5. The numbers are also printed on the printed circuit of the card.



**Figure 1**

***Main power terminal block (X24)***

The electronics of the *CSQ-Visual* and the transducers are powered at 24VDC via the X24 three-pole terminal block.

Name	Function	Terminal
0VDC	Negative power	X24.1
PE	Earth connection	X24.2
+24VDC	Positive power	X24.3

If the internal power feeder is fitted, the switch behind the instrument has to interrupt the phase and neutral before reaching the power feeder. The power feeder output must be connected to terminal block X24.

If the power card CSQVPOW is present, is necessary remove the jumper J1 and connect the power to X24 from terminals X3.11 and X3.12.

### **Inputs terminal block (X3)**

The inputs are optoinsulated and compatible with clean contact signals or 24 VDC PNP transistor outputs.

Name	Function	Terminal	Description
Input 0	START	X3.1	Request for new cycle start
	NU1	X3.2	Do not use
Input 1	T.D.C.	X3.3	“Top dead point” signal, used to reset for a new cycle and in AND with the zero notch of the encoder for the zero of the absolute positions
	NU2	X3.4	Do not use
Input 2	RESET	X3.5	Re-enables the instrument after a reject (rejects basket)
Input 3	A.V. BASKET	X3.6	Consent used in Auto-Check
Input 4	EXT. CHECK or WORKSEL D	X3.7	Selection of work or external good/reject signal
Input 5	WORKSEL C	X3.8	Work selection
Input 6	WORKSEL B	X3.9	Work selection
Input 7	WORKSEL A	X3.10	Work selection (less important)
0VDC	Negative power supply for inputs and outputs	X3.11	
+24VDC	Positive power supply for inputs and outputs	X3.12	

### **Outputs terminal block (X4)**

Outputs for 24VDC loads. For inductive loads such as valves and relays, it is necessary to have a diode parallel to the coils to eliminate peaks in voltage.

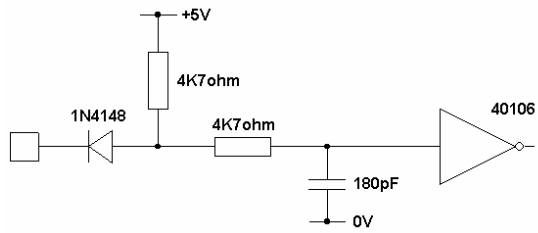
Name	Function	Terminal	Description
Output 0	GOOD	X4.1	Good piece signal. Active after the return of the cylinder until the next start.
0VDC	Power supply earth	X4.2	This terminal can be used as the return of the utilities connected to the outputs. It is connected internally to terminal X3.11.
Output 1	REJECTED	X4.3	Rejected piece signal. Active after the return of the cylinder until the next start. The output is intermittent until the reset signal.
	NU3	X4.4	Do not use
Output 2	GO	X4.5	Enables the press. Active after the start if the instrument is ready and deactivated upon reaching the stoppage value.
Output 3	PROTECTION	X4.6	Command for the closure of the protection or an acoustic signal.
Output 4	MEASURE	X4.7	Activation of external measuring
Output 5		X4.8	
Output 6		X4.9	
Output 7		X4.10	

### **Encoder and 0-10V input terminal block (X5)**

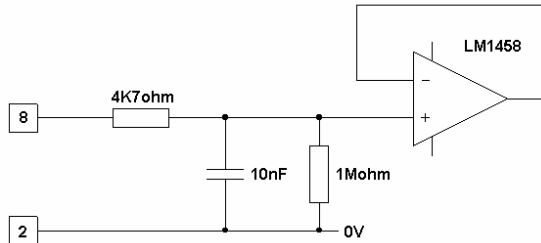
An incremental encoder and a 0-10V signal can be connected to the X5 terminal block. A 12VDC power supply is available for the encoder. A very high-precision 10VDC power supply is available for the potentiometer.

Name	Terminal	Description
0V	X5.1	Screened wire sheath
0V	X5.2	Earth of the encoder or potentiometer
+12V	X5.3	12 V encoder power (200mA max)
+10V	X5.4	10 V potentiometer power (10mA max)
Phase A	X5.5	PHASE A signal
Phase B	X5.6	PHASE B signal
Phase Z	X5.7	Zero notch signal
POT	X5.8	Potentiometer cursor

Electrical features of terminals X5.5, X5.6 and X5.7



Electrical features of terminal X5.8

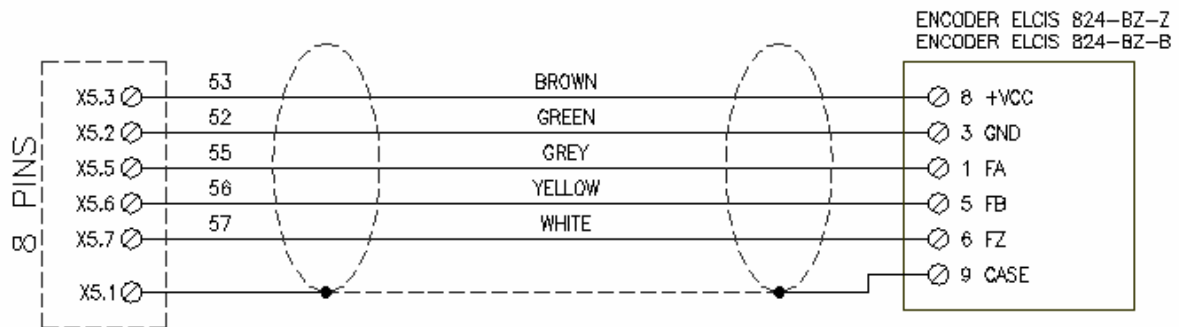
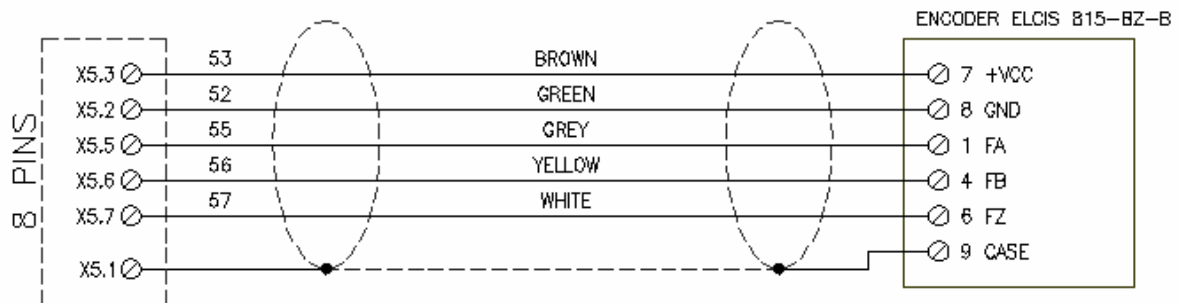
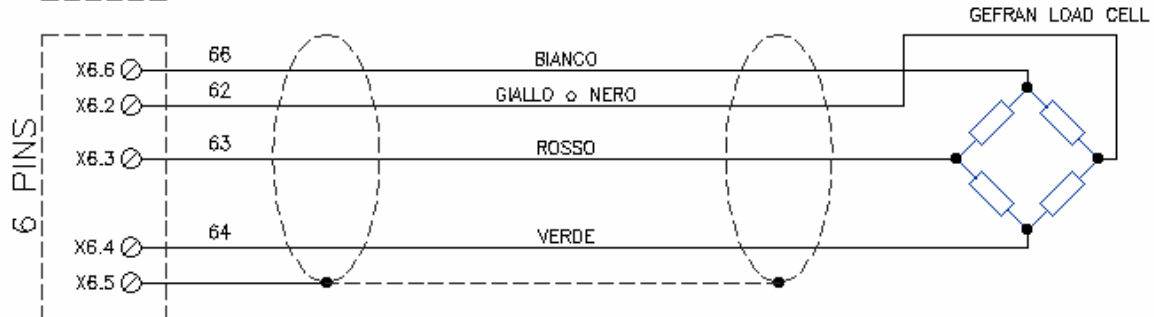
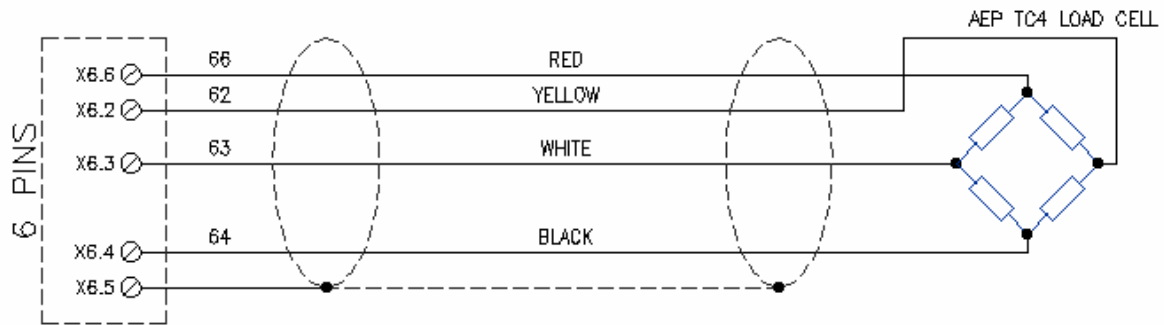


**Load cell terminal block (X6)**

Input for load cell with resistive jumper with a sensitivity of 2mV/V. The power for supply the load cell is also available on this terminal block.

Name	Terminal	Description
0VL	X6.1	Logic earth
IN+	X6.2	Positive input
IN-	X6.3	Negative input
0V	X6.4	Power earth
0V	X6.5	Screened wire sheath
+10V	X6.6	Power positive (60mA max)

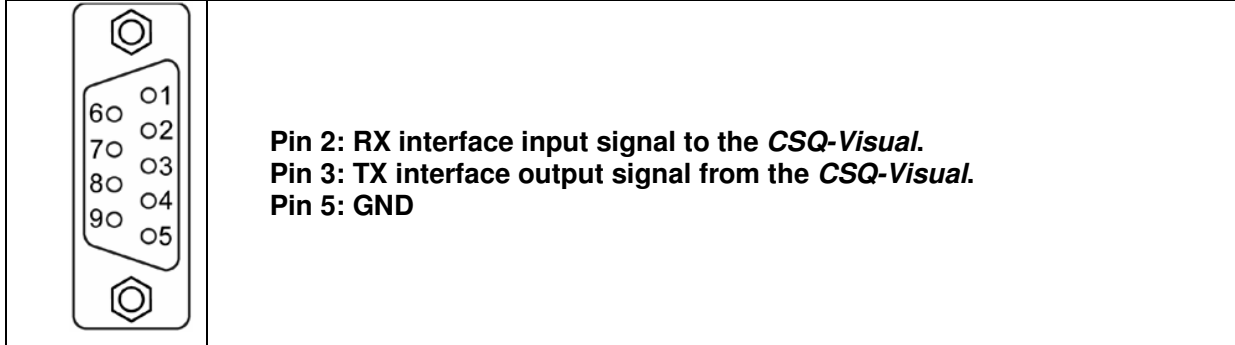
### Typical connection





### Connector D-Sub RS232

The RS232 pinout:



### 1.4.3 CSQVIO6 card options

The CSQVIO6 card can be supplied with special optional features:

#### *Option for RS485 or internal RS232 on X15*

The CSQVIO6 can mount a connector with an RS232 serial port and an RS485 serial port. The *CSQ-Visual* recognises and automatically selects the port connected. It is not possible to use both serial ports at the same time. The RS232 serial port can be used for connections with the computer (WinScope), for connection with a PLC or for connection with a barcode reader. The RS485 serial port can be used only for connection with a PLC.

Name	Terminal	Description
+12VDC	X15.1	Supplied power to the barcode reader or for any interface circuits
TX232	X15.2	RS232 interface output signal from the instrument
RX232	X15.3	RS232 interface input signal to the instrument
A+245	X15.4	Signal A+ of the RS485 interface
B-245	X15.5	Signal B- of the RS485 interface
0V	X15.6	Earth

#### *Option for several load cells*

It is possible to connect up to six load cells to the instrument to simultaneously check six curves. In this case there will be several six-pole terminal blocks identical to X6, marked as shown in the table below:

Terminal block	Description
X6	Channel 1 load cell
X7	Channel 2 load cell
X8	Channel 3 load cell
X9	Channel 4 load cell
X10	Channel 5 load cell
X11	Channel 6 load cell

#### *Option for 0-10 V differential input*

It is possible to have a differential input for the 0-10V signal. In this case there will be a second six-pole terminal block marked X7.

Name	Terminal	Description
	X7.1	Do not use
IN+	X7.2	Positive input
IN-	X7.3	Negative input

0V	X7.4	Power reference
0V	X7.5	Screened wire sheath
	X7.6	Do not use

### *Option for special transducers*

It is possible to request the card adapted for use with special types of transducer. For example, it is possible to use load cells with a 5V power supply or transducers with a 0-10mA output.

## 1.5 Configure automatic work selection

The *CSQ-Visual* supports the automatic selection of work using the combination of the inputs or a command sent to the serial port. This selection can be useful for automatically recognising the piece or the tool fitted.

To enable the automatic selection of work it is necessary to give the instrument the maximum number of selectable works and the way in which they are selected.

To do this, select the **TOOLS > ADVANCED OPTIONS > MACHINE TYPE > WORKS PHASES CHANNELS** menu and change the **Number of selectable works** value; then indicate the selection mode, changing the **Automatic selection code** as shown in paragraph **Errore. L'origine riferimento non è stata trovata.**

After changing the configuration, the instrument will create the selectable works, initially empty; to make an empty work suitable for use, use the **WORKS MANAGEMENT > CHANGE WORK** command and press enter on the work required. Now change the name of the work. The **CREATE NEW WORK** item in the **WORKS MANAGEMENT** menu enables the creation of extra works which can be used separately from the work selected automatically; to create an extra work and use a work other than that selected automatically the unlock password is required.

Automatic selection only works if the instrument START input is not active.

### 1.5.1 Selection through inputs

The work number is obtained from the binary combination of the inputs. The binary code of the first work is zero, i.e.: no input active. The maximum number of selectable works, if enough inputs are available, is 64 (with binary codes from 0 to 63).

The wiring is connected to a terminal block inside the instrument marked X3.

The highest inputs must be used for selection.

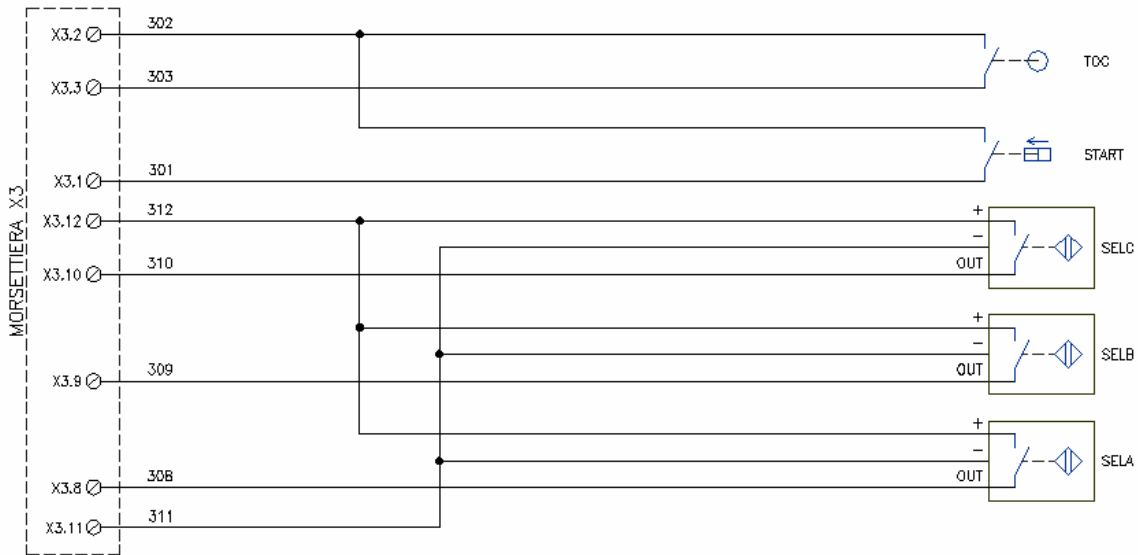
**Example:** assuming the use of the CSQVIO card, which has 8 inputs, if it is necessary to select a maximum of 4 works, inputs 7 and 8 will be used: input 8 will be the least significant bit, while input 7 will be the most significant.

#### 1.5.1.1 Connection of sensors for work selection

It is possible to use positive logic sensors (PNP) or clean contacts for connection to positive.

For example, if it is necessary to connect 4 sensors to the instrument (selection from 9 to 16 works) which has 8 inputs, inputs 5, 6, 7 and 8 must be used. Input 8 will be the least significant bit, while input 5 will be the most significant.

Example of wiring of three sensors (selection of 5 to 8 works):



### 1.5.2 Selection through serial command

The *CSQ-Visual* supports serial communication through which it is possible to select a work remotely. Using serial communication, it is possible to select up to 250 works. To be able to operate it is necessary to enable slow serial communication and set the **Automatic selection code**. For the use of serial communication, see the relative manual.

## 1.6 Configuring the use of the phases

It is sometimes necessary to perform different machining process on the same piece, for instance, different gears are fitted onto a drive shaft one after the other: hence the need to analyse all the different machining phases.

The *CSQ-Visual* is able to manage up to four phases for each single process. The choice of the phase may take place automatically, in succession or through the digital inputs of the instrument.

For every work process is it possible to decide whether to exclude one or more phases.

To enable a function for several phases, it is necessary to indicate the maximum number of phases supported. To do this, select the **TOOLS > ADVANCED OPTIONS > MACHINE TYPE > WORKS PHASES CHANNELS** menu and change the **Number of phases** value. As well as indicating the number of phases, it is necessary to indicate the way to behave, changing the **Automatic selection code**.

If the maximum number of phases is changed, it will be necessary to cancel all the works created previously:

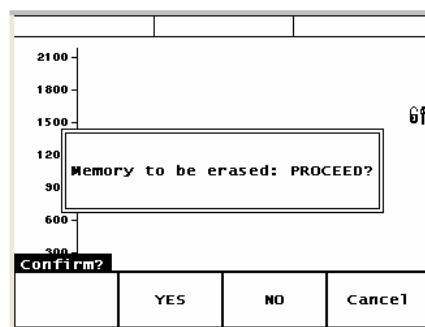


Figure 2

If required, it is possible to save them first on the computer using the *WinScope* program.

## 1.7 Connection of an external reset

When a reject is detected, the instrument blocks, preventing the machining of other pieces. To release the instrument it is necessary to reset the reject. It is possible to connect an external reset signal which can be a button, key or sensor. The reset signal can be left active at all times to have the **autoreset** function. Like all the other inputs, the reset signal has to have a 24VDC clean contact or an electronic sensor with a PNP (positive logic) output.

## 1.8 SETPOINT output

The *CSQ-Visual* has an auxiliary output which can be activated when a determined absolute position or a determined force have been reached. The value of this position or force of the setpoint can be different for every single work.

Once the absolute position or force value has been reached, the output is activated and kept active until the press stops.

With the *CSQ Visual Setup* program it is possible to assign a descriptive name to this output.

This output is normally used to command a hydraulic brake or the start of the press power. Naturally it can be used for any other function.

To set the setpoint activation threshold use the **CHANGE WORK > PARAMETERS > OTHER LIMITS** command.

## 1.9 Instructions for setting up the *CSQ-Visual*

**Always disconnect the instrument from the electricity supply before opening it.**

Open the *CSQ-Visual* by loosening the four screws in the corners of the front panel.



**Figure 3**

Pull out the internal cards by a few centimetres. Then release the cards from the front panel.



**Figure 4**

Pull out all the cards from the container and remove the five terminal block units.

To fasten the instrument in place it is possible to perforate the container on the top or bottom (after removing all the cards) in the middle.

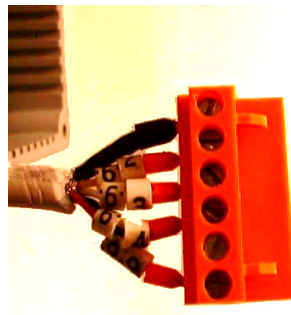
Fit the wire passage and plugs. To fit a larger wire passage, the hole C8 can be enlarged using a stepped cutter.



**Figure 5**

Slot the wires through the wire passage and start wiring.

**It is extremely important for the end of the wire of the load cell which is not covered by a sheath to be as short as possible:**



**Figure 6**

After completing the wiring, insert the card:

Lastly, insert the terminal block units, paying attention to the direction.

**Make sure that cables are not squashed on the bottom of the instrument.**

After completing the wiring it is possible to supply power to the instrument, switching it on using the switch on the back and proceeding as follows:

- Configure the instrument.
- Check the operation of the inputs and outputs, using the controls of the **DIAGNOSIS** menu.
- Calibrate the transducers.