CSQ-Visual

Version with VIO9 card

Installation manual

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 VIO9.

⚠ 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　　　　(CSQVMB) supports the display, keyboard and main CPU.
input e output　(VIO) 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　　VIO9 card wiring

Attention: this information refers only to the VIO9 card. Check that the correct type of card is fitted.

The wiring is supported by removable terminal blocks (X3, X4, X16...). Every terminal on every terminal block is numbered. For example, when terminal X18.7 is indicated, reference is made to the seventh terminal of terminal block X18. The numbers are also printed on the printed circuit of the card.
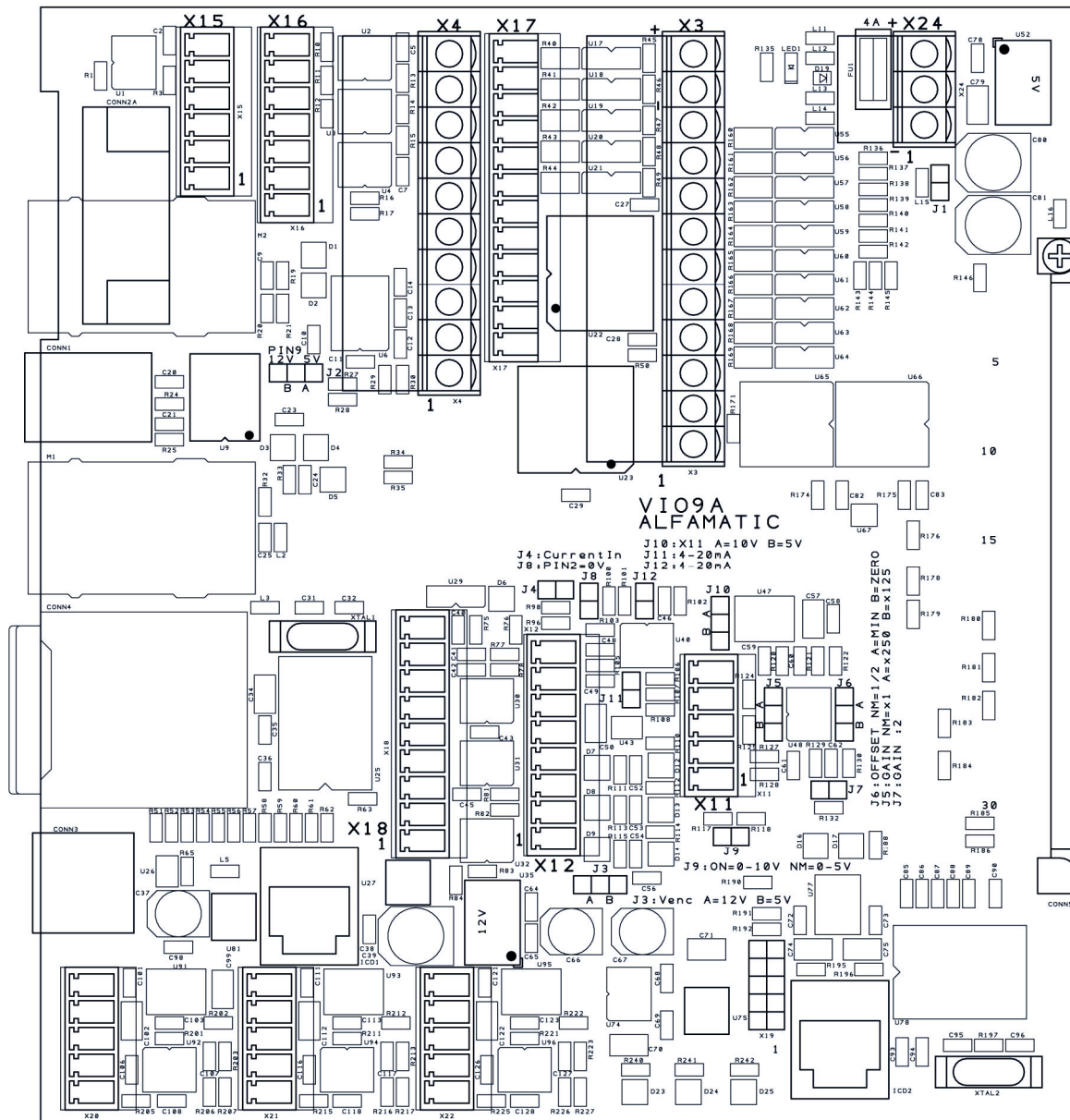

Figure 1

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.

Inputs terminal block (X3)

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

Name	Terminal	Default
Input 0	X3.1	START
Input 8	X3.2	
Input 1	X3.3	T.D.C.(1)
Input 9	X3.4	
Input 2	X3.5	
Input 3	X3.6	
Input 4	X3.7	
Input 5	X3.8	
Input 6	X3.9	
Input 7	X3.10	
0VDC	X3.11	*Negative power supply*
+24VDC	X3.12	*Positive power supply*

(1) T.D.C. input in always on input 1.

The function of each input is configurable. Each input can have one of the following functions:

Name	Default	Function
START	0	Request for starting a new cycle. If remove the acquisition is stopped.
T.D.C.(1)	1	Signal "top dead center", used as a reset for a new cycle and ANDed with the zero mark of the encoder to the zeroing the absolute position
JOB SELECTOR		The binary value of these inputs select automatically a jobs (see 2).
PHASE SELECTOR		The binary value of these inputs select automatically the phase of job.
BASKET 1	2	Input for sensor for the detection of normal rejected (basket)
BASKET 2	3	Input for sensor for the detection of special rejected (basket)
BASKET AUTO-CHECK		Input for sensor for the detection of auto-check samples (basket)
RESET	2	Re-enable the instrument after a rejected
SESPEND ACQUIRE		Suspends the acquisition of the curve useful in hydraulic presses in case of stop in halfway.
ENABLE #		See 2.4
TEST SIGNAL #	#1=4	See 2.4
BOOSTER CYL BACK		Used for the repetition of the working stroke
BOOSTER CYL END		Used for the repetition of the working stroke
MAINTENANCE	5	Disable all controls
TABLE IN POS		Signal for piece in the working position
IMPULSIVE START	Left=6 Right=7	Request for start of a new cycle
NO EMERGENCY		Machine is not in emergency
SAFETY		Machine security (guards closed)
DRIVER ATIVATE		Driver actived (servo presses)
IN POSITION		Position reached (servo presses)

(1) T.D.C. input in always on input 1.

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.

Nome	Morsetto	Default
Output 0	X4.1	GOOD
0V	X4.2	*Negative power supply*
Output 1	X4.3	REJECTED 1
Output 8	X4.4	
Output 2	X4.5	PRESS
Output 3	X4.6	PROTECTION
Output 4	X4.7	CONTACT/BOOSTER
Output 5	X4.8	
Output 6	X4.9	
Output 7	X4.10	

The function of each output is configurable. Each output can have one of the following functions:

| Name	Default	Function
GOOD	0	Good piece signal. Active after the return of the cylinder until the next start.
REJECTED 1	1	Normal rejected piece signal. Active after the return of the cylinder until the next start. The output is intermittent until the reset signal.
REJECTED 2	7	Special rejected piece signal. Active after the return of the cylinder until the next start. The output is intermittent until the reset signal.
REJECTED AUTO-CHECK		Auto-check sample piece signal. Active after the return of the cylinder until the next start. The output is intermittent until the reset signal.
PRESS	2	Enables the press. Active after the start if the instrument is ready and deactivated upon reaching the stoppage value.
DOOR	3	Command for the closure of the protection
BUZZER	4	Command for the closure of the acoustic signal.
TEST OUTPUT	6	Activation of external measuring TEST SIGNAL 1
CONTACT/BOOSTER		Contact to piece or start working stroke
CHECK POINT OUT #		Output activated at a programmable position (up to 3 outputs)
PHASE BIT 0		Active when working the phase 2 or 4
PHASE BIT 1		Active when working the phase 3 or 4
MANUAL		Active when you choose a job that is not a selectable job
BRAKE		Output for a brake to reduce speed
ENABLE RETURN	5	Enable return of the cylinder when detecting a good piece or after reset
ENABLE MANUALE		Control for electric lock lever on mechanical presses
OPEN GREEN BOX		Command for opening basket of the good pieces
CLOSE PK TANK		Closing command of the tank on the Alfamatic PK cilinders
BLOCK OF THE TABLE		Block piece for work
PULL LEVER		Cylinder control help return cylinder (for heavy tools)
RESET DRIVER		Driver reset fault (servo presses)
ENABLE DRIVER		Driver enable (servo presses)

Transducer input terminal block (X12)

An incremental encoder and a 0-10V signal can be connected to the X12 terminal block. A 12VDC or 5VDC power supply is available for the encoder (jumper J3). A very high-precision 10VDC power supply is available for the potentiometer.

Name	Terminal	Description
Phase Z	X12.1	PHASE Z signal
Phase B	X12.2	PHASE B signal
Phase A	X12.3	PHASE A signal
+VDC encoder	X12.4	Encoder power supply J3A*=12V J3B=5V
0VDC	X12.5	GND
AN- (0V)	X12.6	Negative analog differential input (with J8 this imput is internal connected to 0V)
+10V	X12.7	10V potentiometer power (10mA max)
POT+	X12.8	Positive analog differential input (potentiometer cursor) (with J4 this imput accept 0-20mA signal)

Electrical features of terminals X12.1, X12.2 and X12.3
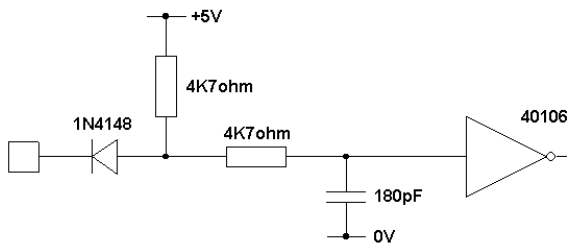
Analog input type on X12

	J4	J9	J11	J12
0-10V*	OUT	IN	IN	OUT
0-5V	OUT	OUT	IN	OUT
0-20mA	IN	IN	IN	OUT
4-20mA	IN	IN	OUT	IN

default

Load cell terminal block (X11)

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

Name	Terminal	Description
IN+	X11.1	Positive input
IN-	X11.2	Negative input
0V	X11.3	Power earth
0V	X11.4	Screened wire sheath
+VDC	X11.5	+5V whit J10A or Logic earth whit J10B

Analog input type on X11

Load cell 2mV/V supply 10V push only *
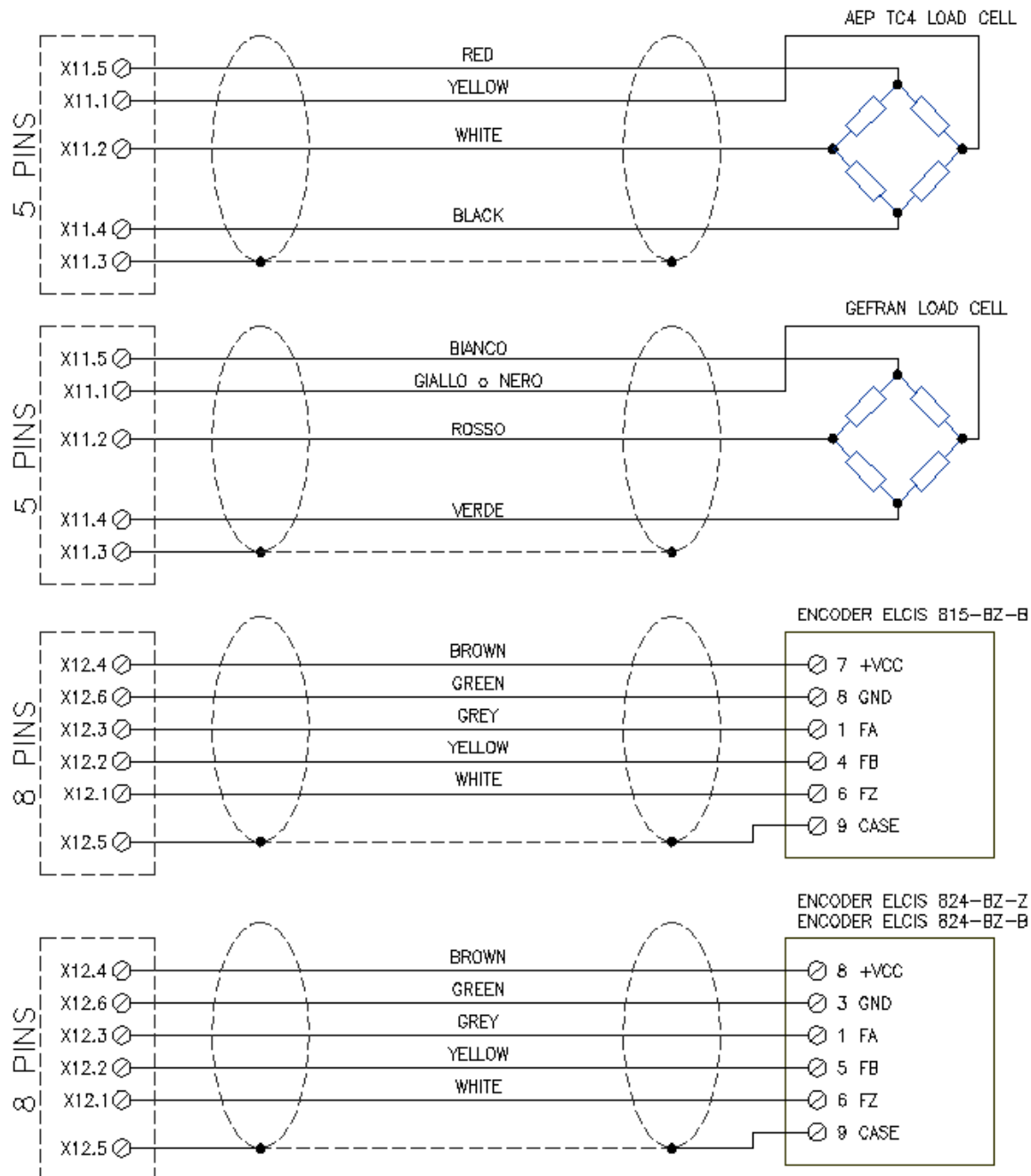Load cell 2mV/V supply 10V push pull
Load cell 2mV/V supply 5V push pull
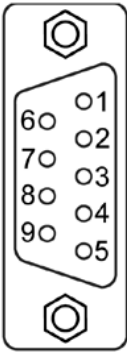Analog input 0-10V
Analog input 0-5V
* default

J5	J6	J7	J10
A	A	OUT	A
B	OUT	OUT	A
A	OUT	OUT	B
OUT	B	IN	A
OUT	B	OUT	B

Typical connection

Optional connector D-Sub RS232

The RS232 pinout:

Pin 2: RX interface input signal to the *CSQ-Visual*.
Pin 3: TX interface output signal from the *CSQ-Visual*.
Pin 5: GND

Optional analog outputs (X16)

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Nome	Morsetto	Descrizione
CLK+	X16.1	Do not connect
CLK-	X16.2	Do not connect
DIR+	X16.3	Do not connect
DIR-	X16.4	Do not connect
ANA2	X16.5	Analog output 2
ANA1	X16.6	Analog output 1
0V	X16.7	GND

2 Special functions

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2.1 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**.

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 in required.

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

2.1.1 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.

2.1.1.1 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):
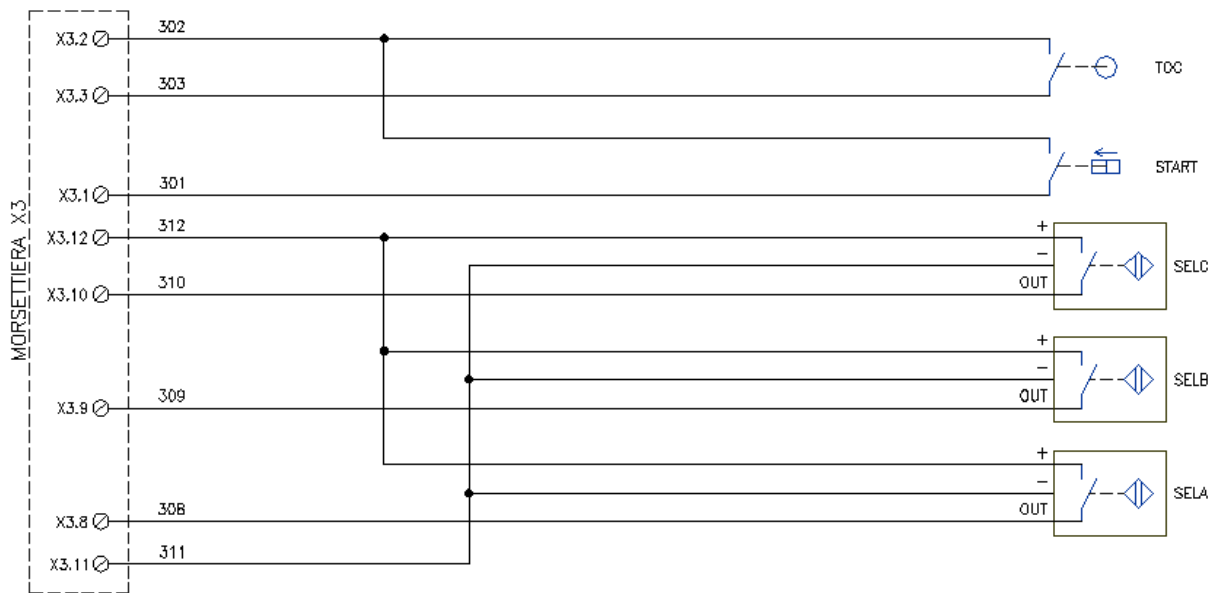
2.1.2 Selection through serial command

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.

2.2 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:
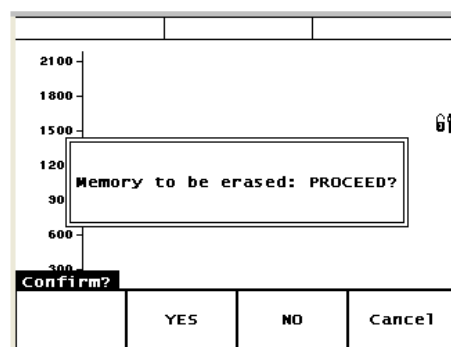

Figure 2

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

2.3 Connection of an external reset

When a reject is detected, the instrument blocks, preventing the machining of other pieces. The 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.

2.4 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.

3 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
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.