Visual Point

Version with VP2STEP1 card

Installation manual

Aug. 1, 2023

1 Introduction

This manual describes the operations required to connect the VISUAL POINT to the machine and to make it operational.

1.1 Important notes for installation

Please read these notes:

Always check the supply voltage required by the instrument before proceeding with the wiring of the same.

This manual ONLY refers to the VP2 version with the VP2STEP1 board of the instrument. The VP2 version is made up of three electronic boards: one on the front with the display, one horizontal for interconnection and one vertical on the back with the terminal blocks.

This tool is not (and could not be) a safety device: the movement of the press must be entrusted to external elements. The tool simply synchronizes the movement of the press for its own operation.

It is very important that the unshielded end of the load cell cable be as short as possible

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

Always connect the instrument case to the earth conductor.

1.2 Principle of operation

Attention: the VISUAL POINT is not (and could not be) a safety device: the movement of the press must be entrusted to external elements . The VISUAL POINT synchronizes the descent for its own functioning. Typically, the GO *unit enabling output is connected in series to the cylinder descent chain.* In other words, if the VISUAL POINT activates the GO output, the cylinder must not moving if it is not in safety.

Operation occurs as follows: when the START input is activated by an external command, the instrument, if ready, activates the protection descent output (PROTECTION), and enables cylinder descent (GO). When the guard is closed a safety device must operate the cylinder. When the tool removes the cylinder enable signal (GO) the press must go back. The VISUAL POINT, therefore, commands the stop of the press by removing the GO signal. The VISUAL POINT continues to control the curve until the force begins to decrease or the TDC input is activated. Only then does it provide the pass or fail signal.
If the piece is good, the GOOD output is activated and the PROTECTION output is deactivated. Conversely, if the piece is rejected, the REJECTED output is activated intermittently and the PROTECTION output is left active. When the RESET input is activated or the operator presses the **RESET** 

button on the keyboard, the instrument keeps the reject output fixed and deactivates the protection output.

The RESET input can be connected directly to +24V to leave it always active so that the instrument is always ready to perform a new cycle.

The START input must be kept active throughout the cycle, otherwise, "test interrupted" is signaled and the piece is discarded.

The correct zeroing of the encoder takes place using its zero notch and the cylinder reverse signal (TDC top dead center). Zeroing is performed by the instrument when the top dead center limit switch is activated and at the same time the encoder zero mark appears. Therefore, for correct zeroing it is necessary to ensure the presence of the zero notch in the interval in which the limit switch is active.

It is possible to connect a piece presence sensor (ENABLE) which enables the start only when the relative input is active. To use this signal, it is necessary to activate the relevant option in the instrument configuration.

By changing the configuration value (see user manual) it is possible to connect an acoustic signaler instead of the protection descent command which signals each reject piece.

Again, changing the configuration value (see user manual) it is possible to set up a waste bin with a sensor which, connected to the RESET input, re-enables the machine only when each waste piece is binned.

There is a SETPOINT output which is activated when the start position is measured or when a pre-set value is reached (see paragraph 3.6).

The job (or recipe, or program) that the instrument must use can be selected via some inputs: see chapter 3.7. The selected job changes whenever the status of the selection inputs changes. After the start signal, the selected job is maintained until the end of the cycle.

2 Mechanical assembly

There are two versions of VISUAL POINT: 24VDC and 115-230VAC.
Before connecting the instrument, check the supply voltage with maximum safety.

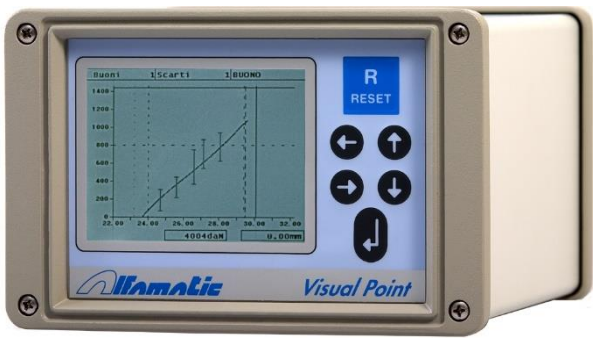
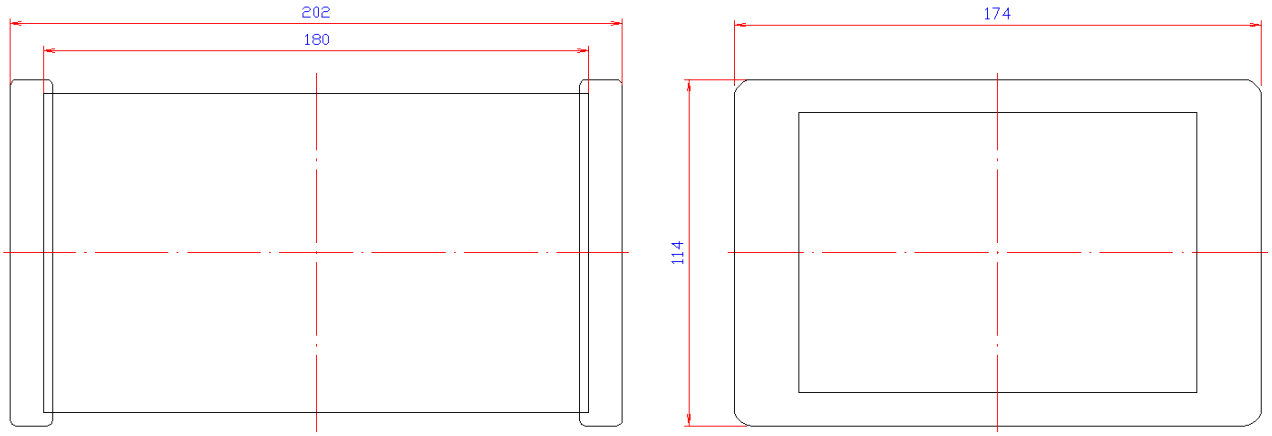


Figure1

2.1 Dimensions

Measurements in millimeters.

Version for external mounting
To the indicated depth it is necessary to add the overall dimensions of the cables of at least 80mm.



3 Implementation of the VISUAL POINT

The VISUAL POINT is divided into two opto-isolated sections. The first section mounts the control electronics and the conditioning and transducer interface electronics. The second section mounts the electronics of the digital inputs and outputs.
The two sections have separate power supplies both at 24VDC.
The power supply of the two sections can be the same.
In the version with container and internal power supply (Figure2), the power supply of the two sections must be taken from the power supply itself which in turn must be powered by the mains voltage interrupted by the switch on the rear panel. The internal power supply allows direct connection of the instrument to the mains, accepting voltages from 100VAC up to 240VAC at both 50Hz and 60Hz.

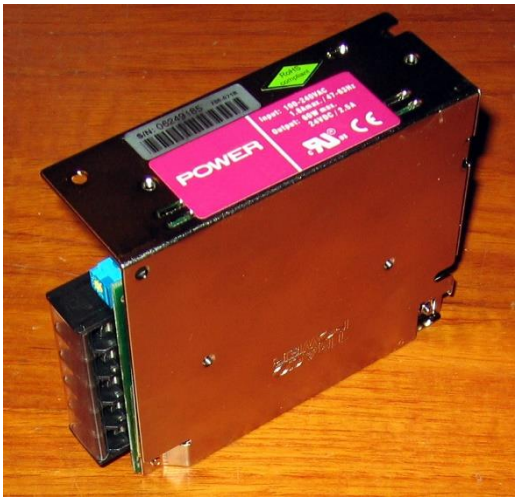


Figure2

3.1 Wiring instructions

The VISUAL POINT has different input and output signals. The force and position transducers and the command signals are connected at the input. At the output there are the signals to control the unit descent enabling valve, the protection closing valve and the signalers.
The input signals to the instrument can be with *clean contact* or with positive logic at 24Vdc, ie with PNP transistor output.
The VISUAL POINT outputs, when active, supply a voltage of 24Vdc. The maximum load of each outlet is 15 watts. For higher loads it is necessary to use support relays. The total maximum load supported by the instrument when it has the internal power supply is 50 watts.

The PLC must have positive logic at 24Vdc, therefore with PNP type inputs and outputs. The signals indispensable for the functioning of the VISUAL POINT are the following: TDC, START, GO, GOOD, REJECTED. The RESET signal can be connected directly to the positive if you don't want the block of the instrument in case of rejected piece.
The wiring rests on various numbered removable terminal blocks (X1, X3, X4…). Each terminal of each terminal block is also numbered. For example, when terminal X5.7 is indicated, reference is made to the seventh terminal of terminal block X5.

3.1.1 Power terminal block (X1)

The electronics and transducers are powered via the three-pole terminal block X1.

First name	clamp	Function
0VDC	X1.1	Negative power supply
PE	X1.2	Earth connection
+24VDC	X1.3	Positive feeding

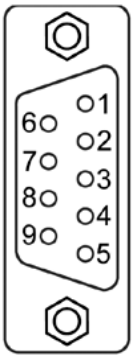
If the internal power supply is present, the switch behind the instrument must interrupt the phase and the neutral before reaching the power supply itself. The output of the power supply must be connected to the X1 terminal block.

This terminal block does not power the input/output section which is separated by opto-isolators from the instrument electronics. To power the input and output section, connect terminals X3.11 and X3.12 to the power supply.

3.1.2 Serial port terminal block (CONN1)

Present only in the *Visual Point* version with container.

On the back of the *Visual Point* with container there is a D-Sub 9-pin male connector for the RS232 serial connection. The pinout of the connector is as follows:



Pin 2: RX incoming line of the *Visual Point*.
Pin 3: TX line outgoing from *Visual Point*.
Pin 5: GND signals mass

3.1.3 Serial port terminal block (X9)

Present only in the *Visual Point* version for panel mounting.

On the back of the *Visual Point* for panel mounting there is the X9 terminal board for the RS232 and RS485 serial connection. The pinout of the connector is as follows:

3.81mm pitch terminal block.

First name	clamp	Description
	X9.1	Do not use
TX	X9.2	RS232 output - signal to computer RX: connect to pin 2 of computer D-SUB 9 male connector
RX	X9.3	RS232 input - signal from computer TX: connect to pin 3 of computer D-SUB 9 male connector
A+	X9.4	RS485 positive signal
B-	x9.5	RS485 negative signal
0V	X9.6	Ground – signal reference: connect to pin 5 of the computer's male D-SUB 9 connector

3.1.4 Input terminal block (X3)

Opto-isolated inputs for clean contact signals or with PNP 24VDC transistor output.

First name	Function	clamp	Description
IN0	START	X3.1	
IN1	CCT	X3.2	
IN2	RESET RED BASKETBALL	X3.3	
IN3	ENABLE JOB SELECTOR	X3.4	For selection, see chapter 3.7
IN4	EMERGENCY OK JOB SELECTOR	X3.5	For selection, see chapter 3.7
IN5	GREEN BASKETBALL JOB SELECTOR	X3.6	For selection, see chapter 3.7
IN6	JOB SELECTOR	X3.7	For selection, see chapter 3.7
IN7	JOB SELECTOR	X3.8	For selection, see chapter 3.7
IN8	JOB SELECTOR	X3.9	For selection, see chapter 3.7
IN9	JOB SELECTOR	X3.10	For selection, see chapter 3.7
0VP	Input and output power supply	X3.11	Ground of the power supply of the "inputs and outputs" section
+24P	Input and output power supply	X3.12	Positive of the power supply of the "inputs and outputs" section

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Maximum current of each single input          10mA
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Input operation description:

Function	Description
START	Request to start a new cycle
CCT	"Top dead center" signal, used as a reset for a new cycle and in AND with the zero mark of the encoder for zeroing the transducer
RESET	Optional. Re-enables the tool after a discard.
ENABLE	Optional. Cycle start enabling signal.
EMERGENCY OK	Optional. Guards ready signal.
JOB SELECTOR	Optional. Job selection command.
RED BASKETBALL	Optional. Waste piece trashed signal.
GREEN BASKETBALL	Optional. Good piece trashed signal.

3.1.5 Output terminal block (X4)

Outputs for 24VDC users. For inductive loads, such as valves and relays, a diode must be mounted in parallel with the coils to eliminate overvoltage.

First name	Function	clamp	Description
OUT0	GOOD	X4.1	
OUT1	REJECTED	X4.2	
OUT2	GO	X4.3	
OUT3	PROTECTION BUZZERS	X4.4	Function selected by instrument configuration
OUT4	CONTACT/BOOSTER SETPOINT PULL UP	X4.5	Feature selected based on press type or tool configuration
OUT5	TANK RETURN REJECTED2 MARKGOOD	X4.6	PK series cylinder tank management Return cylinder management Special reject signal Good piece stamping signal
OUT6	OPENDOOR	X4.7	
OUT7		X4.8	
	NU	X4.9	Do not connect
0VP	Power ground	X4.10	This terminal is connected directly to terminal X3.11. Allows for cleaner wiring when connecting utilities directly to this terminal block

Output operation description:

Function	Description
GOOD	Good piece signal. It is activated when the cylinder begins the return stroke and remains active until the next start.
REJECTED	Reject piece signal. It is activated when the cylinder begins the return stroke intermittently until the next start. The output is intermittent until the offset is reset.
GO	Enable the press. Activated after start if the instrument is ready and deactivated when a stop value is reached.
PROTECTION	Guard closing command. Activated at start and deactivated with good piece. With scrap remains active until the scrap is reset.
BUZZERS	Acoustic signal command. Activated with a scrap piece, it remains active until the scrap is reset.
CONTACT/BOOSTER	Contact signal or start of work. Activated when the force exceeds the threshold set in "start force" and deactivated when a stop value is reached. It is not activated if the TDC input is active
SETPOINT	Signal activated beyond a programmable force or quota (See chapter 3.6)
PULL UP	Retraction aid cylinder control signal
TANK	Tank closing signal of the Alfamatic cylinder type PK
RETURN	Cylinder return consent signal
REJECTED2	Special scrap signal. It is activated when the cylinder starts the return stroke if the piece is rejected and the reject causes are among those selected as special. The configuration of the special rejects is done with the Visual Point Setup software (See chapter 3.8).

3.1.6 Encoder and 0-10V terminal block (X12)

3.81mm pitch terminal block.

First name	clamp	Description
Phase Z	X12.1	Zero mark signal
Phase B	X12.2	PHASE B signal
Phase A	X12.3	PHASE A signal
+12V	X12.4	12V encoder power supply
0V	X12.5	Shielding
0V	X12.6	Mass
+10V	X12.7	+10V power supply
pot	X12.8	0-10V input

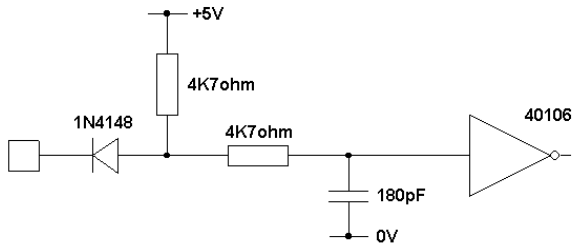
Electrical characteristics of terminal X12.4:

Output voltage	12V ±20%
Continuous output current	200mA

Electrical characteristics of terminal X12.7:

Output voltage	10V ±0.5%
Continuous output current	10mA
Protections	Current, Temperature

Electrical characteristics of terminal X12.1, X12.2 and X12.3:



3.1.7 Load cell terminal block (X11)

Input for resistive bridge load cell with sensitivity of 2mV/V.
3.81mm pitch terminal block.

First name	clamp	Description
IN+	X11.1	Positive input
IN-	X11.2	Negative input
0VL	X11.3	Shielded cable braiding
0V	X11.4	Power ground
+10V	X11.5	Positive feeding

Electrical characteristics of terminal X11.5:

Output voltage	10V ±10%
Continuous output current	60mA
Protections	Current, Temperature

It is very important that the unshielded end of the load cell cable be as short as possible:

3.1.8 Analog output terminal block (X10)

3.81mm pitch terminal block.

Name	clamp	Description
NU	X10.1	Do not connect
NU	X10.2	Do not connect
NU	X10.3	Do not connect
NU	X10.4	Do not connect
NU	X10.5	Do not connect
NU	X10.6	Do not connect
NU	X10.7	Do not connect
0V	X10.8	Analog output ground
ANA1	X10.9	Analog output 1 0-10V
ANA2	X10.10	Analog output 2 0-10V

3.2 Connection examples

Alfamatic standard load cell and encoder wiring:

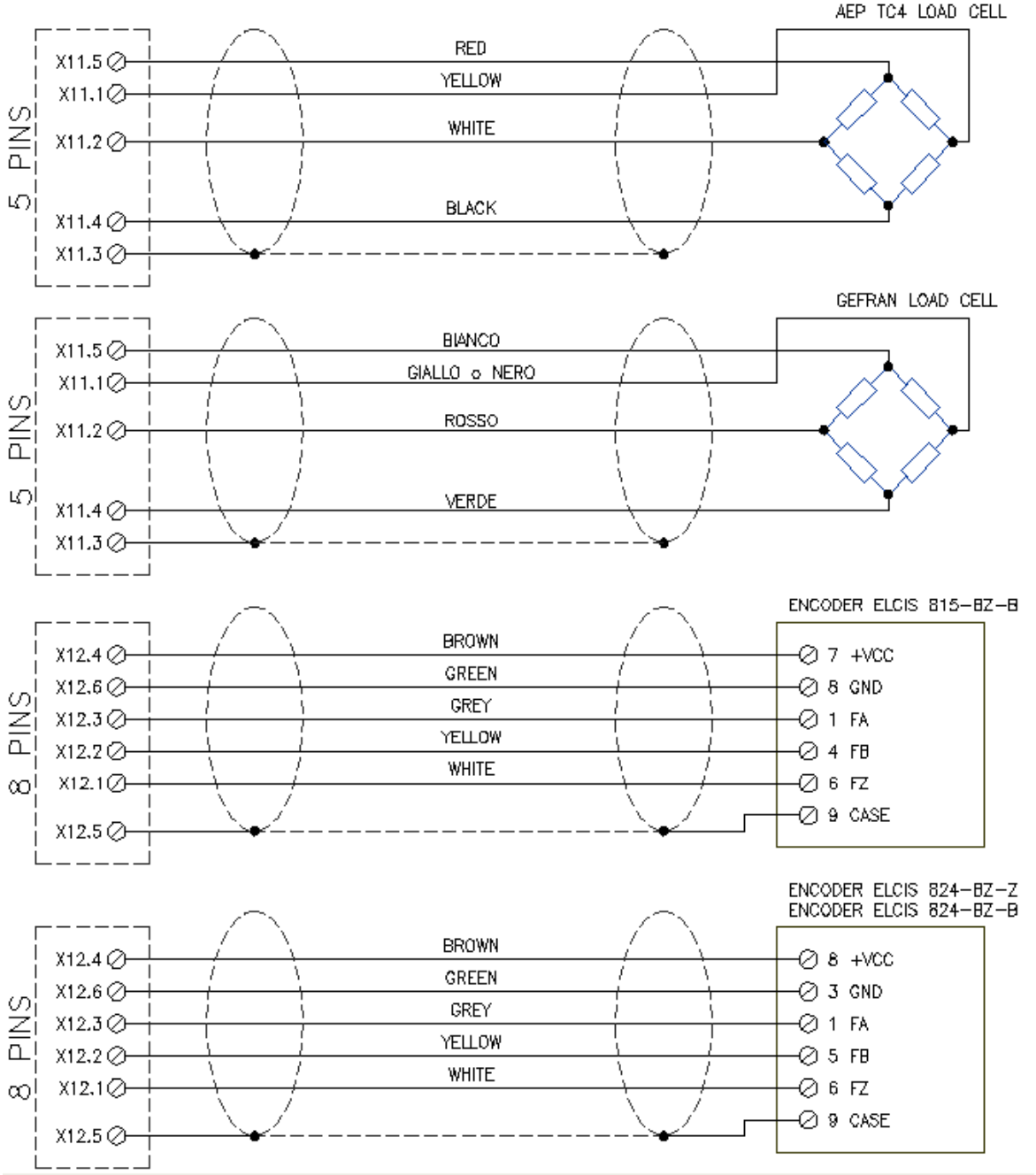


Figure4

3.3 Instructions for assembling instrument with container

To fix the tool to the machine it is possible to drill the box. If it is fixed in the lower part, it is necessary to take into account the card that must be inserted in the lowest groove. The fixing screws cannot therefore protrude more than 7 mm.

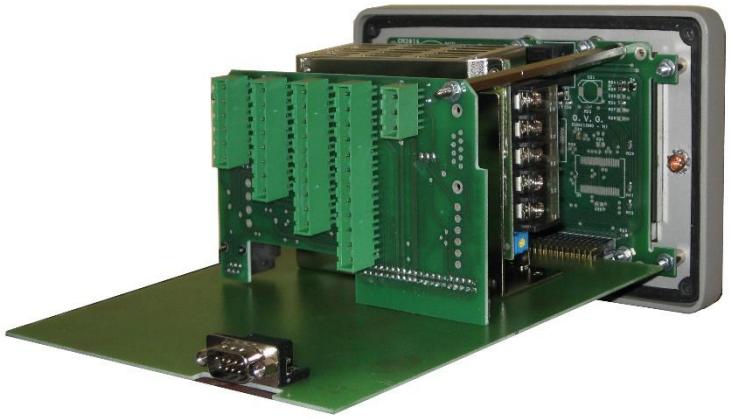


Figure5

To open the VISUAL POINT with container, unscrew the four screws placed in the corners of the rear panel and the front panel.

Remove the terminal block assemblies.

Extract the electronic boards from the front (Figure5).

Fit the necessary cable glands and plugs (Pg 9).

Insert the cables in the cable glands and start wiring as per the wiring diagram.

After wiring, insert the card.

Insert the groups of terminal blocks respecting their length and their direction of insertion.

3.4 Put in action

Once the wiring is completed, it is possible to power the instrument and follow the next steps:

- Turn on the instrument and check that the display lights up.
- Go to the menu **Configuration > Information > Show advanced functions .**
- **Configuration > Machine** menu and activate the desired options (see user manual).
- Proceed with the calibration of the instrument (see user manual).
- Check that the sensors and connected utilities work correctly using the commands in the **Diagnosis menu** (see user manual).

3.5 Encoder alignment

If the encoder is replaced or if the top dead center is shifted, the encoder must be repositioned correctly. To be able to do this, you must first reset the height offset as described in the user manual and then follow the instructions below:

3.5.1 For Alfamatic presses type M-OP

Turn on the instrument and remove the cover covering the encoder, the rack and the top dead center limit switch by unscrewing the two screws. Keeping the limit switch pressed, lower the cylinder with the lever of the press, in this way, on the instrument display, you will see the value change which at

a certain point will return to zero. This is the exact position of the encoder zero mark. Now pull the encoder back to disengage the pinion from the rack, hold it in this position and return the cylinder back to TDC. Keeping the encoder released from the rack, lower the cylinder by about one millimeter. At this point it is possible to leave the encoder. Raise the cylinder to the top dead center and check that the instrument indicates a value between –3 and –1 mm.

To verify the exact positioning, switch the instrument off and on again: at this point the quota must be zero. Lower the cylinder with the lever and bring it back to the top dead centre: at this point the instrument must display a negative value of a few millimetres.

3.5.2 For standard Alfamatic presses

First of all, press the emergency button of the press, turn on the instrument and open the upper cover of the rack block, which is closed by two cross-head self-threading screws. Inside you can see the encoder pinion. Unscrew the two screws that fix the encoder and move it upwards, in this way, on the instrument display, you will see the value change which, at a certain point, will return to zero. This is the exact position of the encoder zero mark. Now move the encoder about one millimeter down so that the display reads –1 millimetre. By pulling the encoder back it is possible to release the pinion from the rack, in this way it is possible to return the encoder to its original position without the instrument modifying the position. In practice, it must be possible to fix the encoder and display a value between –3 and –1 millimeters as the quota.

To verify the exact positioning, switch the instrument off and on again: at this point the quota must be zero. Start the press and return it to the top dead centre: at this point the instrument must display a negative value of a few millimetres.

3.6 Programmable output SETPOINT

The VISUAL POINT has a SETPOINT output which is normally activated when the start position is measured (see user manual) and deactivated when the stop value is reached. This can be used to start the work phase after the approach phase.
By changing the configuration value it is possible to cause the SETPOINT output to be activated when a settable quota or force is reached.
Always changing the configuration value it is possible to make sure that the SETPOINT output is deactivated not when the cylinder stops but only when the press has returned completely back (TDC input active) and, with the rejected piece, the reset is not given . In practice, this configuration makes it possible to connect a decelerator or a gripper which holds the piece in position to the SETPOINT output.

Note:

The SETPOINT output is activated only when the TDC input is not active.

The SETPOINT output is activated even without the START signal.

3.7 Job selection via inputs

The VISUAL POINT supports automatic job selection via inputs. This automatic selection can be useful for the automatic recognition of the mounted tool. To use the automatic job selection it is necessary to enter how many jobs must be able to be selected, to do this it is necessary to change the "Number of selectable jobs" value in the configuration menu.
The combination of inputs is binary. The maximum number of jobs that can be selected is 64.
By connecting a single selection input it is possible to choose a maximum of 2 jobs ; by connecting two inputs it is possible to select 4 jobs; with three inputs 8 jobs and so on.
The wiring takes place in a terminal block inside the VISUAL POINT instrument marked X3.

The sensors must be connected to the JOB SELECTOR inputs shown in paragraph 3.1.2. The weight of each input depends on the number of selectable jobs indicated in the configuration.

From 1 a16 jobs with or without use of the ENABLE input:

	Weight
JOB SELECTOR IN7	1
JOB SELECTOR IN6	2
JOB SELECTOR IN5	4
JOB SELECTOR IN4	8

From 17 to 32 jobs without use of the ENABLE input:

	Weight
JOB SELECTOR IN7	1
JOB SELECTOR IN6	2
JOB SELECTOR IN5	4
JOB SELECTOR IN4	8
JOB SELECTOR IN3	16

From 17 to 32 jobs using the ENABLE input:

	Weight
JOB SELECTOR IN5	1
JOB SELECTOR IN6	2
JOB SELECTOR IN7	4
JOB SELECTOR IN8	8
JOB SELECTOR IN9	16
JOB SELECTOR IN3	ENABLE

With more than 32 jobs with or without use of the ENABLE input:

	Weight
JOB SELECTOR IN4	1
JOB SELECTOR IN5	2
JOB SELECTOR IN6	4
JOB SELECTOR IN7	8
JOB SELECTOR IN8	16
JOB SELECTOR IN9	32
JOB SELECTOR IN3	ENABLE

3.8 Special waste selection

To select which reject causes activate the REJECTED2 output , use the Visual Point Setup software. In the tools menu Settings select the item Special rejected bit mask . A window will appear where you can enter the number obtained from the sum of the values of each reject cause that is of interest to recognise.

Cause reject	Value to add
NORAGGFMIN	1
SUPEROFMAX	2
NORAGQMIN	4
SUPEROQMAX	8
NORAGQIMIN	16
SUPEROQIMAX	32
EXTERNAL STOP	64
TIMEOUT	128
NORAGGFCP1MIN	256
SUPEROFCP1MAX	512
NORAGGFCP2MIN	1024
SUPEROFCP2MAX	2048
NORAGGFCP3MIN	4096
SUPEROFCP3MAX	8192
NORAGGFCP4MIN	16384
SUPEROFCP4MAX	32768
NORAGGFCP5MIN	65536
SUPEROFCP5MAX	131072
NORAGGFCP6MIN	262144
SUPEROFCP6MAX	524288
NORAGGFCP7MIN	1048576
SUPEROFCP7MAX	2097152
NORAGGFCP8MIN	4194304
SUPEROFCP8MAX	8388608