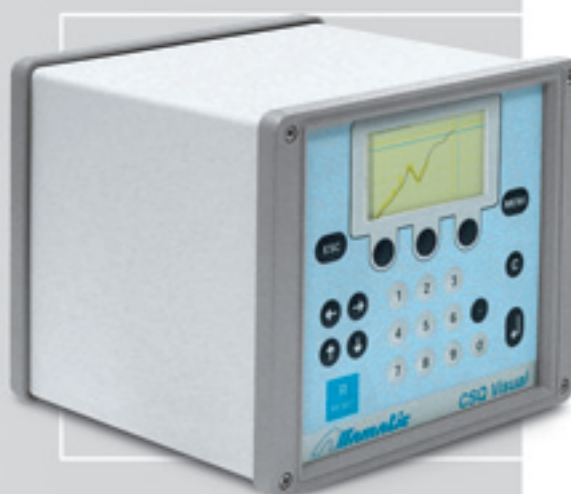




QUALITY CONTROL SYSTEMS

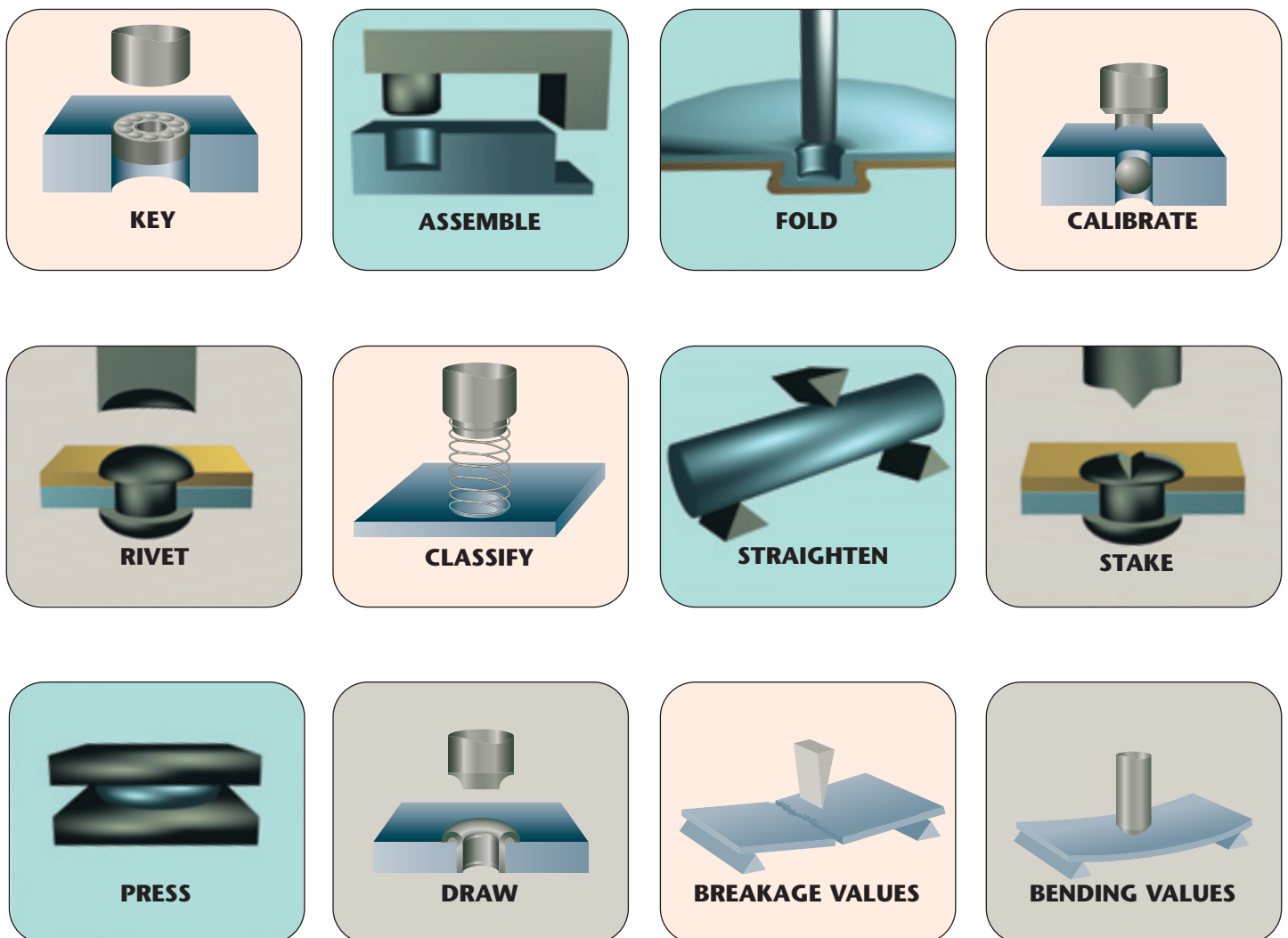


CONTROLLING THE PARAMETERS

of a manufacturing process is essential for
guaranteeing 100% quality

ALFAMATIC OFFERS

a range of force/motion monitoring instruments and systems
used to control the various production operations



INSTRUMENTS DESIGNED FOR A VARIETY OF PRODUCTION EQUIPMENT:

Pneumatic – hydraulic – hydropneumatic – manual presses

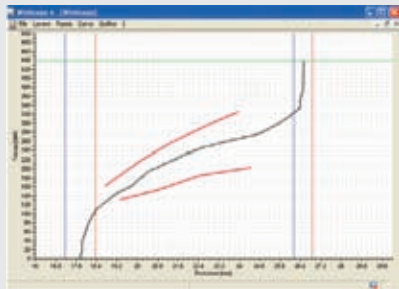
Screwing devices – Torque/rotation control

Test laboratories – Quality control – Prototyping – Assembly lines

PRODUCT RANGE

TRO

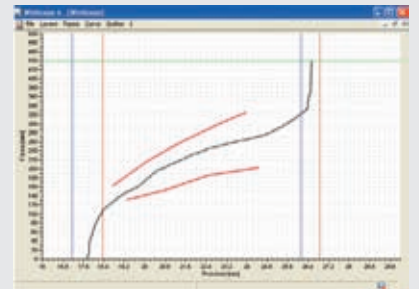
page 5



Process control system by range. Based on an industrial computer, displays the process curve on an LCD.

CSQ VISUAL

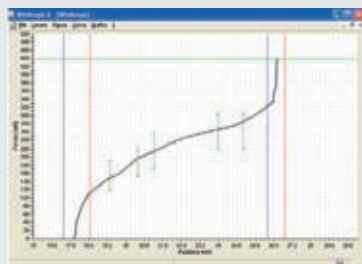
page 6



Process control system by range. Displays the process curve on a $\frac{1}{4}$ VGA graphic display.

CHECK-POINT

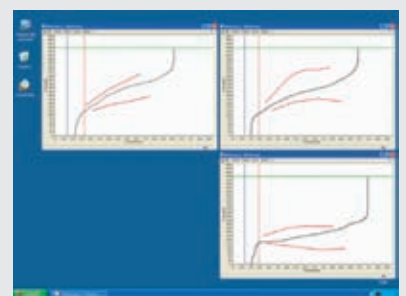
page 7



Control system by checkpoint. Displays the parameters on an alphanumeric display and the curve on a $\frac{1}{4}$ VGA graphic display.

TRO Automation

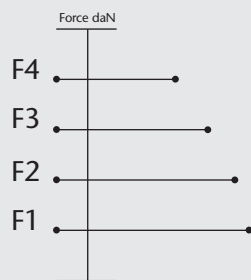
page 8



Multi-axial control module by range. For installation inside electrical cabinets.

CEL

page 9



Microprocessor instrument for the real time display of the force applied.

SENSORS

pages 10-11



INCREMENTAL
ROTARY
TRANSDUCERS



LINEAR
POSITION
TRANSDUCERS



LOAD
CELLS

WINSCOPE®

page 9

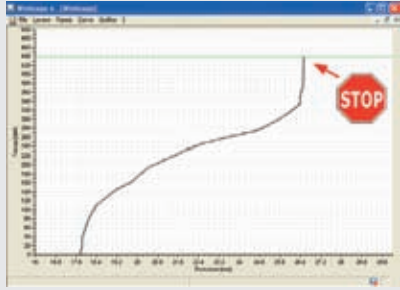


The Winscope® PC software is supplied as **standard** with all Alfamatic instruments (with the exception of the CEL model). It provides powerful production display, analysis and control tools.



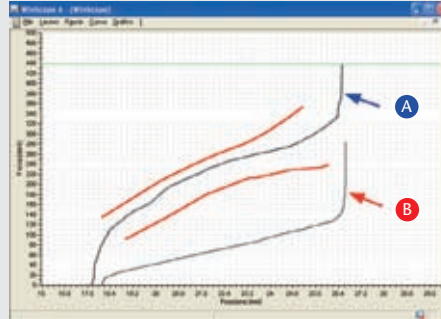
MANAGEMENT AND CONTROL OF MANUFACTURING PROCESSES

Management of the stop point of the press



Controls the stop and return points of the press when a specific force and/or stroke value is reached.

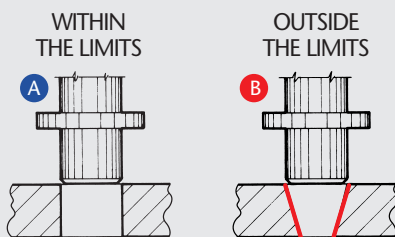
Assembly interference control



The interference between two parts to be assembled is controlled throughout the entire operation.

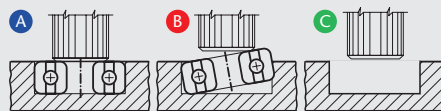
- A** = execution with correct interference
- B** = execution with interference outside the limits (too loose) with the curve below the limit range

Geometric control of the part



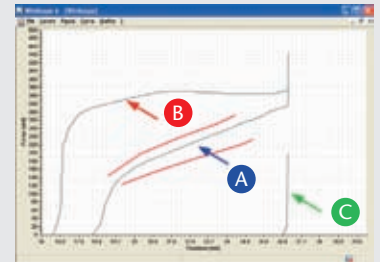
Geometric errors, if any, are displayed by non-conforming process curves.

Control of the presence and correct position of the part

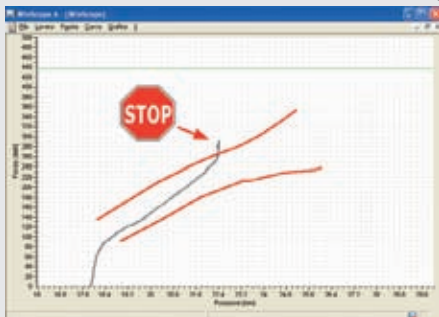


Examples of positions and associated process curves.

- A** = part correctly positioned
- B** = part incorrectly positioned
- C** = part not inserted in its seat

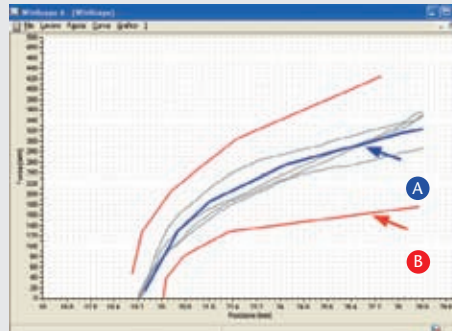


Non-destructive monitoring



For large and expensive parts. The cycle stops whenever the monitoring curve is outside the range.

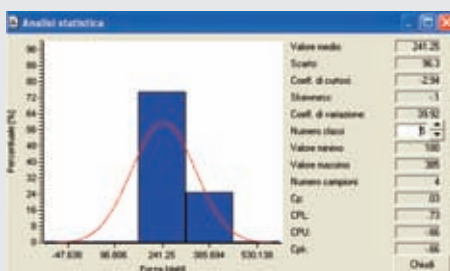
Automatic determination of the control parameters



Available with manual or statistical method, with enveloping of the minimum and maximum values and definition of the average curve.

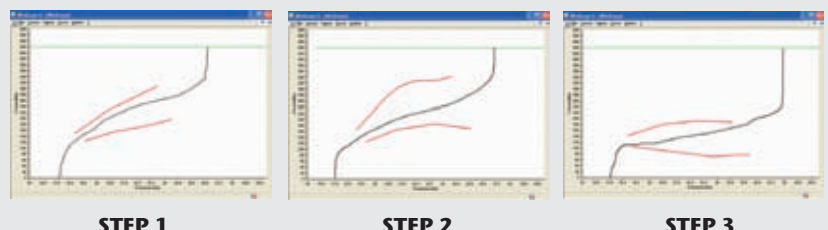
- A** = average enveloping curve of several process curves
- B** = control range generated by assigning a specific limit to the average curve in point A

Statistical analysis



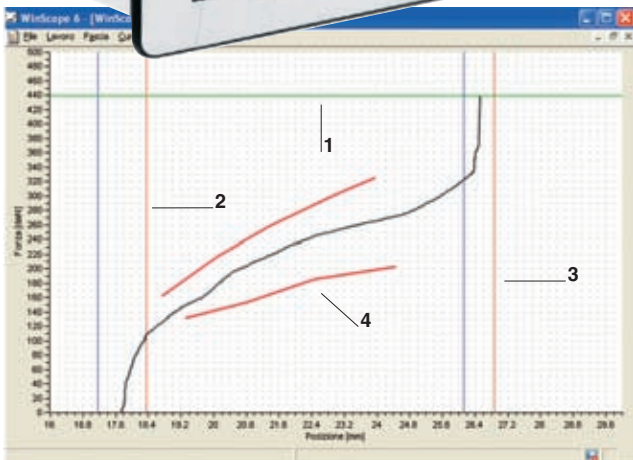
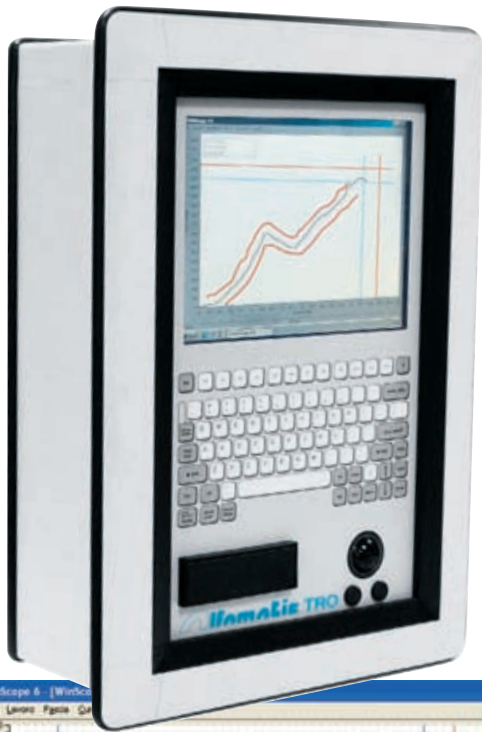
The software includes powerful functionality for the statistical analysis of the production performed (with calculations of CP/CPK, averages, variances, etc.).

Sequential control of different processes



For parts that require several different processes to be performed in succession: the control instrument (TRO, CSQ-VISUAL, TRO Automation) automatically sets the control parameters for the specific process step.

TRO SYSTEM



Graphic display with the WINSCOPE® program, already installed in the instrument (specifications on page 9).

Performances

Sampling frequency:	> 1000 Hz
Maximum position detection error:	$\pm 0,01$ mm.
Maximum force detection error:	0,5%
Number of processes that can be saved:	> 1.000.000
Cycle time:	< 1 sec.

Specifications

Position transducer:	Incremental encoder with zero setting or 0-10V analog transducer
Force transducer:	Load cell with 2mV/V resistor
Power supply:	Single-phase 230 Vac (115 Vac optional)
Inputs:	Clean contact or opto-insulated, 24 Vdc positive voltage transistors (PNP)
Outputs:	Opto-insulated, 24 Vdc positive voltage transistors (PNP)
Dimensions:	Width: 420 millimeters Height: 600 millimeters Depth: 210 millimeters

TRO is a measurement system that provides 100% quality control of manufacturing processes. Interfaced to a position transducer and a force transducer, it continuously monitors the position/force curve and verifies that it is within a specifically positioned continuous control range.

The system consists of the following two components:

- 1) An industrial computer to enter the parameters, display and save the process curves.
- 2) A data acquisition module installed on the machine (inside the electrical cabinet) and connected to the industrial computer.

Control functions

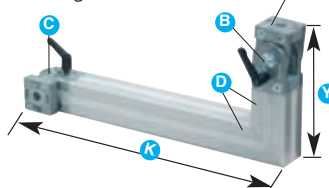
The TRO system consists of the following functions, among others, to control the pressing process:

- 1 **Stop values** to control the return of the press to the TDC
- 2 **Process start control** to verify the presence and correct position of the part
- 3 **Process end limits** to control the final values of force and distance
- 4 **Control range** to verify all the process curves in real time

Accessories

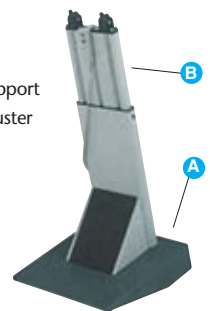
90° SUPPORT – PTTR MODEL

- A Instrument fixing flange
- B 90° adjuster
- C Wall fixing flange
- D Aluminium frame
- K Width dimension
- Y Height dimension



DESK STYLE SUPPORT - MOD. BASS

- A Ground support
- B Height adjuster rail



ALARM SYSTEMS



SOUND
CODE SON



LUMINOUS
CODE LUM

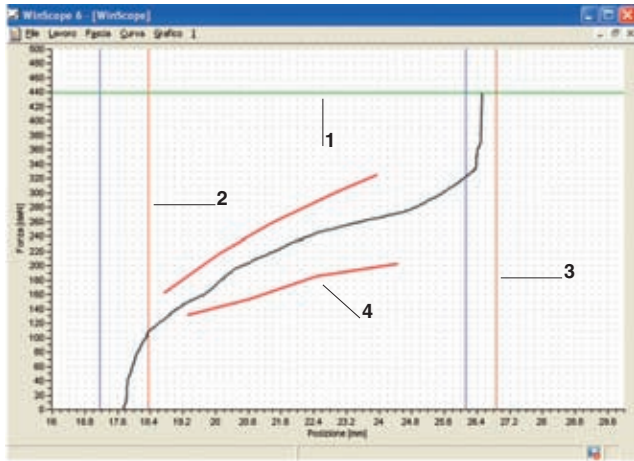
SENSORS



See pages
10-11 for details



CSQ-VISUAL SYSTEM



Graphic display with the WINSCOPE® program, installed on a PC connected to CSQ Visual (specifications on page 9).

Performances

Sampling frequency:	> 1000 Hz
Maximum position detection error:	± 0,01 mm.
Maximum force detection error:	0,5%
Number of processes that can be saved:	250 (16 selected from inputs)
Cycle time:	< 1 sec.

Specifications

Position transducer:	Incremental encoder with zero setting or 0-10V analog transducer
Force transducer:	Load cell with 2mV/V resistor
Power supply:	Single-phase 230 Vac (115 Vac optional)
Inputs:	Clean contact or opto-insulated, 24 Vdc positive voltage transistors (PNP)
Outputs:	Relay with 24 Vdc common or positive voltage transistor (inquire about availability)
Communication ports:	RS232 serial or USB
Dimensions:	Width: 175 millimeters Height: 205 millimeters Depth: 240 millimeters

CSQ-VISUAL is a measurement system that provides 100% quality control of manufacturing processes. Interfaced to a position transducer and a force transducer, it continuously monitors the position/force curve and verifies that it is within a specifically positioned continuous control range.

The system architecture is based on a data monitoring and analysis multiprocessor and is connected directly to the sensors.

The instrument itself supplies the power for the machine valves, the transducers and limit stop and warning lights, if any.

Control functions

The CSQ-VISUAL system consists of the following functions, among others, to control the pressing process:

- 1 **Stop values** to control the return of the press to the TDC
- 2 **Process start control** to verify the presence and correct position of the part
- 3 **Process end limits** to control the final values of force and distance
- 4 **Control range** to verify all the process curves in real time

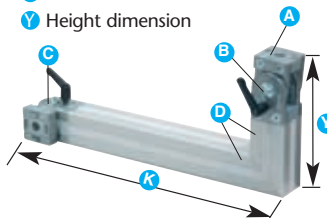
6-cells version

CSQ-VISUAL is also available in a 6-cells configuration for the simultaneous control and display of up to six load cells (using a single position transducer).

Accessories

90° SUPPORT – PTTR MODEL

- A Instrument fixing flange
- B 90° adjuster
- C Wall fixing flange
- D Aluminium frame
- K Width dimension
- Y Height dimension



FASTENING SYSTEM - MOD TAV



ALARM SYSTEMS



SOUND
CODE SON



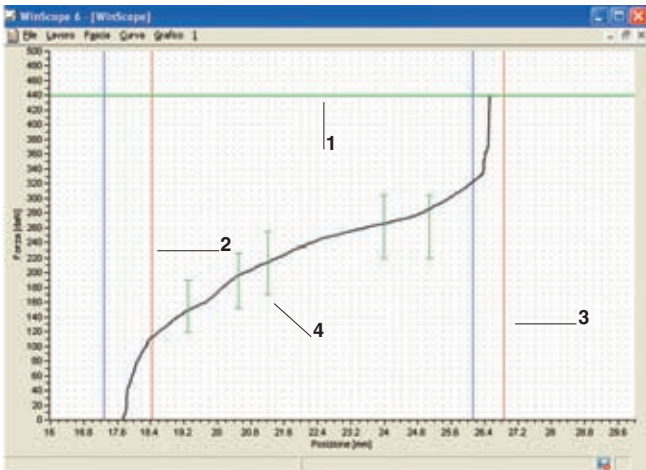
LUMINOUS
CODE LUM

SENSORS



See pages
10-11 for details

CHECK POINT SYSTEM



Graphic display with the WINSCOPE® program, installed on a PC connected to CHECK POINT (specifications on page 9).

CHECK POINT (version also available with a VISUAL POINT graphic display) is a measurement system that provides 100% quality control of manufacturing processes. Interfaced to a position transducer and a force transducer, it verifies that the pressure applied is within the specific limits **in eight predetermined positions**.

CHECK POINT can also be connected to a personal computer via the WINSCOPE® software to display the curves and modify the parameters.

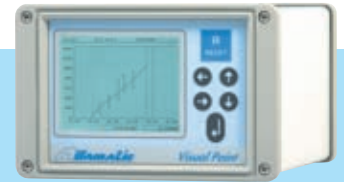
The instrument itself supplies the power for the machine valves, the transducers and limit stop and warning lights, if any.

Control functions

The CHECK POINT system consists of the following functions, among others, to control the pressing process:

- 1 **Stop values** to control the return of the press to the TDC
- 2 **Process start control** to verify the presence and correct position of the part
- 3 **Process end limits** to control the final values of force and distance
- 4 **Check Points** to verify all the process curves in real time

VISUAL POINT with graphic display



Performances

Sampling frequency:	> 1000 Hz
Maximum position detection error:	$\pm 0,01$ mm.
Maximum force detection error:	0,5%
Number of processes that can be saved:	16 (selected from the inputs)
Cycle time:	< 1 sec.

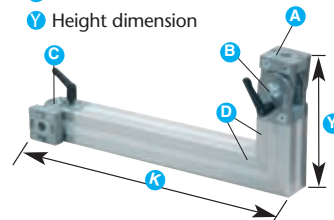
Specifications

Position transducer:	Incremental encoder with zero setting or 0-10V analog transducer
Force transducer:	Load cell with 2mV/V resistor
Power supply:	Single-phase 230 Vac (115 Vac optional)
Inputs:	Clean contact or opto-insulated, 24 Vdc positive voltage transistors (PNP)
Outputs:	Relay with positive voltage 24 Vdc common
Communication ports:	RS232 serial
Dimensions:	Width: 175 millimeters Height: 115 millimeters Depth: 200 millimeters

Accessories

90° SUPPORT – PTTR MODEL

- A Instrument fixing flange
- B 90° adjuster
- C Wall fixing flange
- D Aluminium frame
- K Width dimension
- Y Height dimension



ALARM SYSTEMS



SOUND CODE SON

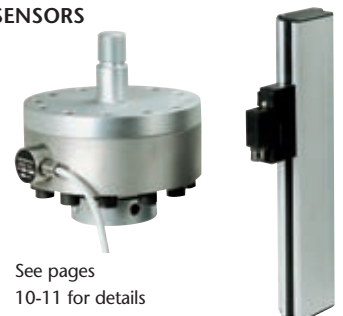


LUMINOUS CODE LUM

FASTENING SYSTEM MOD TAV



SENSORS



See pages 10-11 for details

TRO AUTOMATION SYSTEM

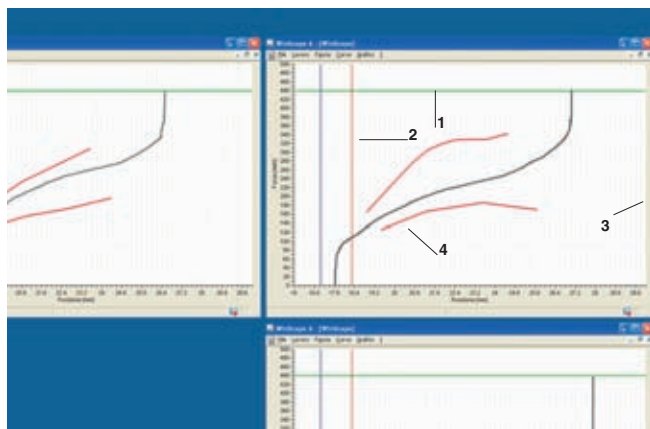


The TRO Automation system with the USB connection



TRO Automation is a control instrument used for **assembly lines and stations**. Able to control several pressure axes simultaneously, the TRO Automation system is a module that is installed to DIN standards rails inside an electrical cabinet.

Interfaced to a position transducer and a force transducer, the system verifies that the working stroke is within a specific range. It also stops the machine if a specific force and/or distance is reached.



Multi-curve display with the WINSCOPE® program, installed on a PC connected via USB (specifications on page 9).

Control functions

The TRO AUTOMATION system consists of the following functions, among others, to control the pressing process:

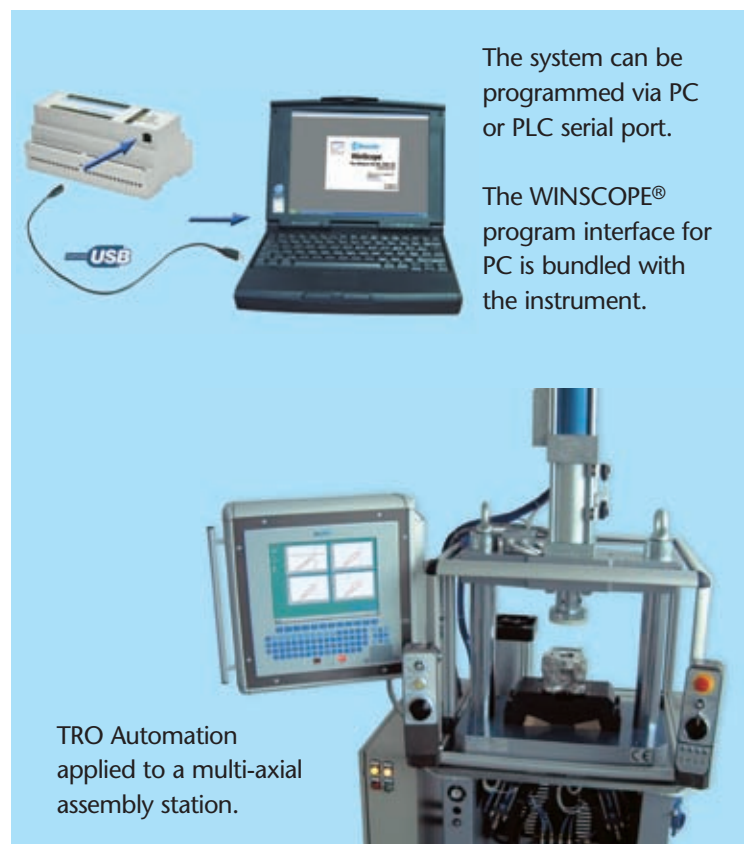
- 1 **Stop values** to control the return of the press to the TDC
- 2 **Process start control** to verify the presence and correct position of the part
- 3 **Process end limits** to control the final values of force and distance
- 4 **Control range** to verify all the process curves in real time

Performances

Sampling frequency:	2 x 1000/sec.
Maximum position detection error:	0,01 mm.
Maximum force detection error:	0,5%
Number of processes that can be saved:	32 (selected from the inputs)
Cycle time:	< 1 sec.

Specifications

Position transducer:	Two inputs per incremental encoder with zero setting and two inputs per 0-10V analog transducer
Force transducer:	Two inputs per load cell with 2mV/V resistor
Power supply:	24 Vdc
Inputs:	Clean contact or opto-insulated, 24 Vdc positive voltage transistors (PNP)
Outputs:	Opto-insulated, 24 Vdc positive voltage transistor
Communication ports:	USB, Ethernet, RS485, RS232 (inquire about availability)
Dimensions:	Width: 158 millimeters Height: 71 millimeters Depth: 90 millimeters



The system can be programmed via PC or PLC serial port.

The WINSCOPE® program interface for PC is bundled with the instrument.

TRO Automation applied to a multi-axial assembly station.

CEL SYSTEM



The CEL system is composed of a load cell and a microprocessor for the real time display of the force applied. The force value can be preselected in accordance with the power unit used.

In the standard configuration, the instrument has four programmable set points with a relay output to connect to a PLC.

Specification (instrument)

Accuracy	± 0,5%
Linearity error	± 0,5%
Programmable set points	4
Programmable hystereses	4
Conversions per second	50
Relay outputs	4
Power supply	230Vac
Maximum absorption	10VA
Protection class	IP40
Dimensions	WIDTH: 180 mm. HEIGHT: 150 mm. DEPTH: 200 mm.

Displays the peak pressure value

Displays the force applied

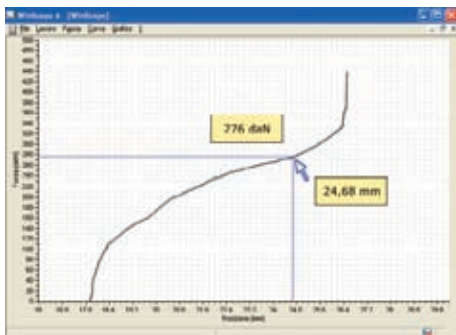
Stops the unit when the force value entered is reached

WINSCOPE®

WINSCOPE® is the PC interface program that is supplied as standard with all the control instruments (with the exception of the CEL system).

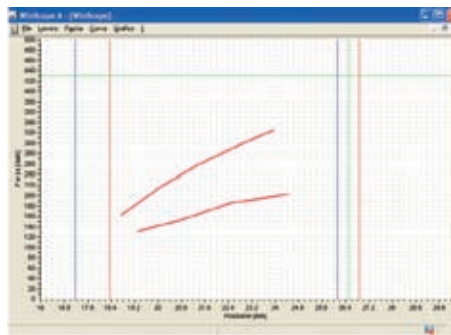
Designed to increase the capacity of the instruments, the software allows for the easy programming of the control parameters and provides an excellent display of the process curves (on the PC).

Below are a few advantages resulting from the use of **WINSCOPE®** with the control instruments:



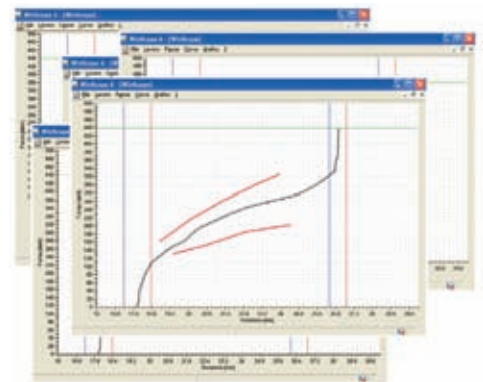
Analyzing the curve

Real time display of the process curve. It also monitors the force value at every point of the stroke.



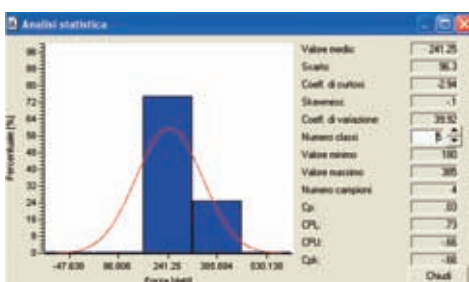
Entering the parameters

The control parameters can be entered and modified via the PC mouse and keyboard.



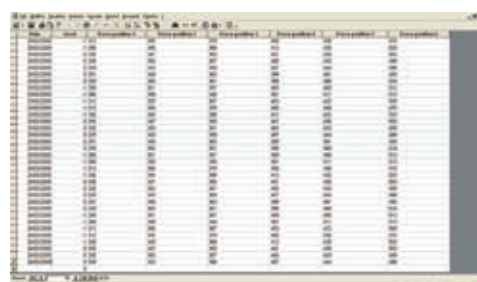
Archiving the curves

Winscope® can save process curves of the entire production or part of it.



Statistical analysis

Powerful graphic/parametric functionality for the statistical analysis of the production performed.



Database

The production data can be archived in an ACCESS database.

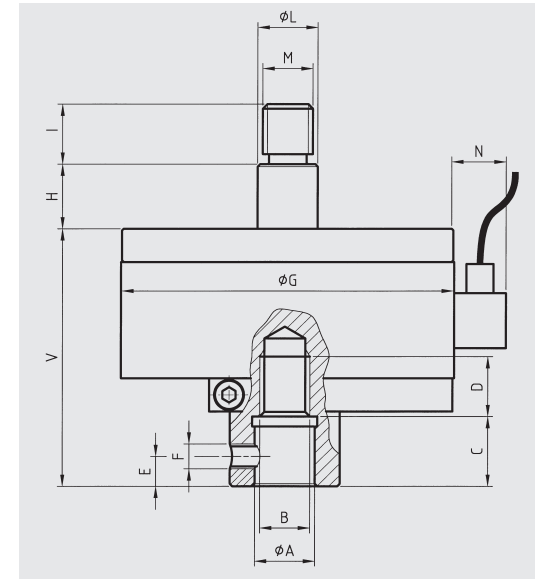
THE SENSORS

PIEZORESISTANT LOAD CELLS FOR STATIC AND DYNAMIC APPLICATIONS



Piezoresistant load cell to monitor the thrust force. Complete with fastening flange and lower tang with anti-rotation device in cadmium-plated C40 steel. Can be supplied with SIT calibration certification (upon request).

Model	TC4 5	TC4 10	TC4 25	TC4 50	TC4 100	TC4 200	TC4 300	TC4 500	TC4 750	TC4 1000
NOMINAL FORCE KN	5	10	25	50	100	200	300	500	750	1000
REPEATABILITY	±0.2% F.S.									
HYSTERESIS	±0,05% F.S.									
NOMINAL SENSITIVITY	2mV/V									
CALIBRATION LIMIT	±0,1% F.S.									
INPUT RESISTANCE	800 ±20					430 ±20				
OUTPUT RESISTANCE	705 ±2					352 ±2				
STANDARD POWER SUPPLY	10 V									
NOMINAL POWER SUPPLY	1-15 V									
MAXIMUM POWER SUPPLY	18 V									
MECHANICAL LIMIT VALUES IN RELATION TO NOMINAL FORCE										
service force	120%									
limit force	150%									
breaking force	>300%									
dynamic limit force	75%									
MAXIMUM RISE TO NOMINAL FORCE	- 0.06 mm		- 0.09 mm			- 0.17 mm			- 0.23 mm	
NOMINAL TEMPERATURE RANGE	-10/+40°C									
WEIGHT	1,60kg		2,45kg			5,80kg			16,5kg	
PROTECTION CLASS	IP67									
DYNAMOMETRIC MATERIAL	Stainless Steel									
CABLE LENGTH	5 m									



	MODEL TC4				
	5 - 10 - 25	50	100	200 - 300 - 500	750 - 1000
A	16	20	25	30	40
B	M12x1,5	16x1,5	20x1,5	M27x2	M36x2
C	18	22	28	35	45
D	12	16	20	27	35
E	8	10	12	15	20
F	M6	M8	M8	M8	M10
G	100	127	127	165	230
H	16	20	26	33	43
I	12	16	20	27	35
L	16	20	25	30	40
M	M12x1,5	M16x1,5	M20x1,5	M27x2	M36x2
N	21	22	22	23	24
V	70	75	85	110 - 155*	190

*Applies to model 500

TORSIOMETERS FOR STATIC AND DYNAMIC APPLICATIONS

Torque sensors. STRAIN GAUGE measurement principle. Monitoring range from 1 to 2000 Nm

STATIC

with countershaft

STATIC

with double flange

STATIC

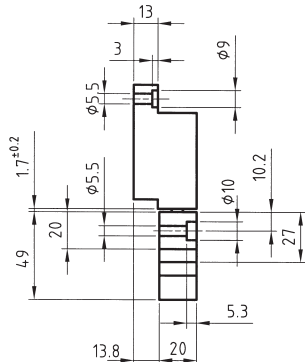
with flange and countershaft

INCREMENTAL ROTARY

with splined shaft

THE SENSORS

THE SENSORS

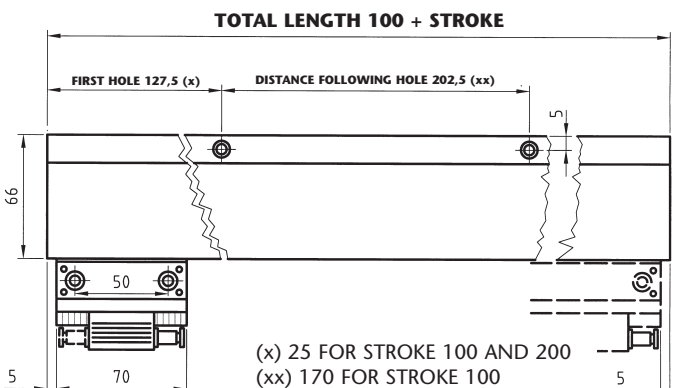


COD CR80 ...

Linear position transducer with pre-assembled rack and pinion encoder system. Square wave incremental output. Measurement monitoring range between 0-34000 mm. Available with standard or customized supports for fastening to the movable part of the machine.

Specifications

Type	Incremental bidirectional with zero setting
Standard stroke (mm):	200 mm (different strokes upon request)
Output:	88C30 type driver
Resolution:	0.01 mm with x4 external multiplication (different resolutions upon request)
Electrical connections:	With connector located on cursor
Maximum detection speed:	20 m/min
Max. permissible acceleration:	15 m/s ²
Start-up force:	6 N
Max. error over entire stroke:	± 10µm
Operating temperature:	0-71°C
Maximum frequency:	60 kHz
Power supply:	8-15V (different power supply voltages upon request)
Maximum mA consumption:	120 mA
Weight:	4700 grams/meter



Customized fastening supports upon request

Incremental rotary transducers



PART NUMBERS FOR ORDERING

CONTROL SYSTEMS

CONTROL SYSTEM	TRO - CSQ VISUAL - CHECK POINT - VISUAL POINT - TRO A. - CEL
ALARM SYSTEM	SOUND code SON
	LUMINOUS code SON
FASTENING SYSTEM	STAND code BASS - WITH FEET code TAV
FASTENING SYSTEM	90° SUPPORT code PTTR

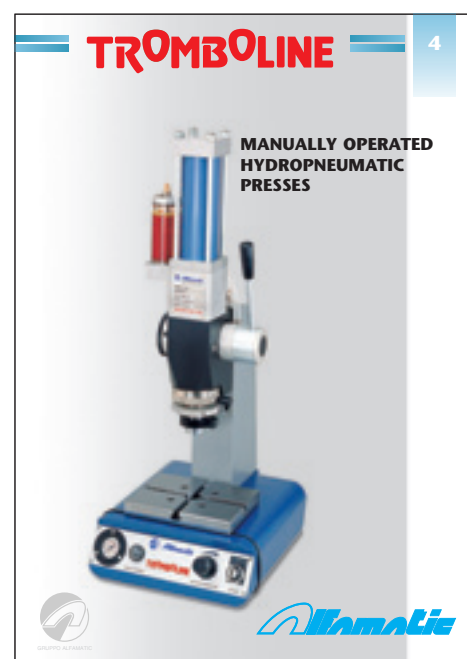
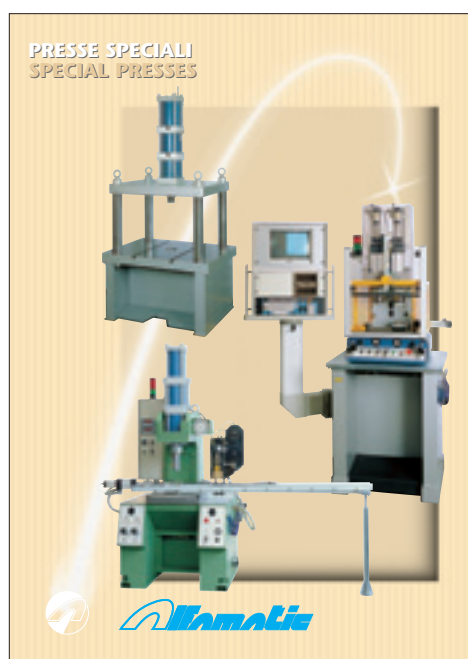
CODE	K mm	Y mm

SENSORS

LOAD CELLS	Standard flanges code TC4
	Special flanges code FLTC4
LINEAR TRANSDUCERS	Encoder code CR - 80.....
ROTARY TRANSDUCERS	series M1 - S2 - R3 - C4 - C5.....
TORSIOMETERS	mod. SPA - FDS - AFS - AIR

CODE	STROKE mm

PRODUCTION PROGRAM



Dealer or distributor



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Tel. +39 0331 406911
Telefax +39 0331 406970
E-mail: info@alfomaticgroup.it
www.alfomatic.net

Edition 2