VM15 HMI

Quick guide

User manual
VMx5 HMI - Quick guide

9UMENX521-1200
Release: 220128

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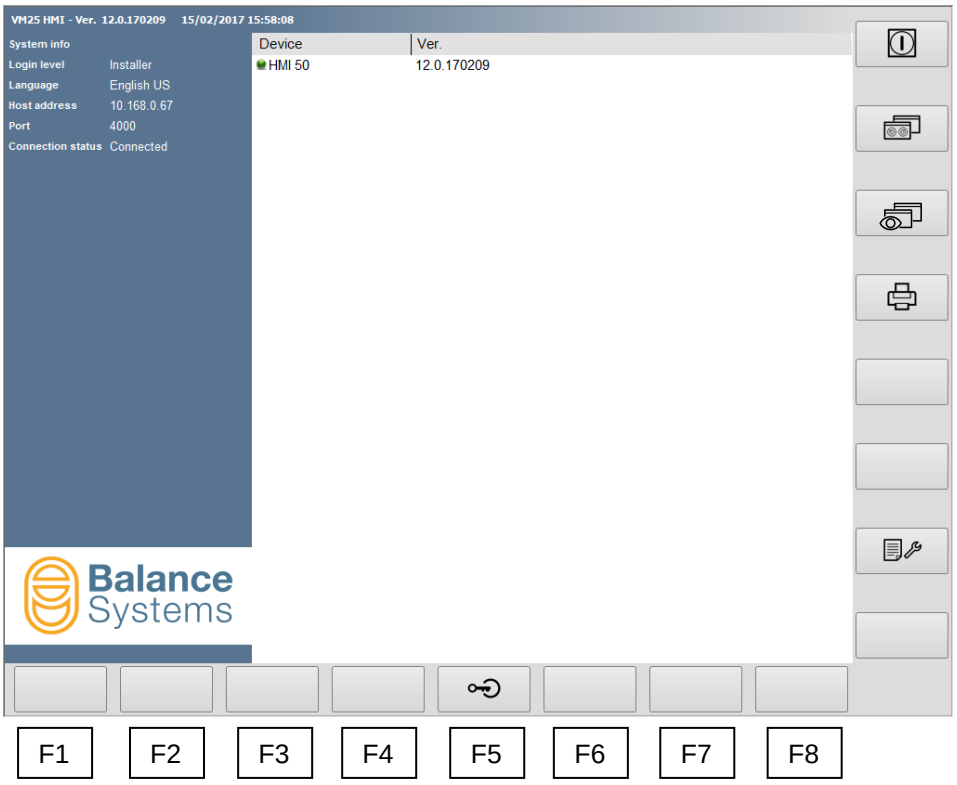
VM15 HMI & Keyboard



LEGENDA

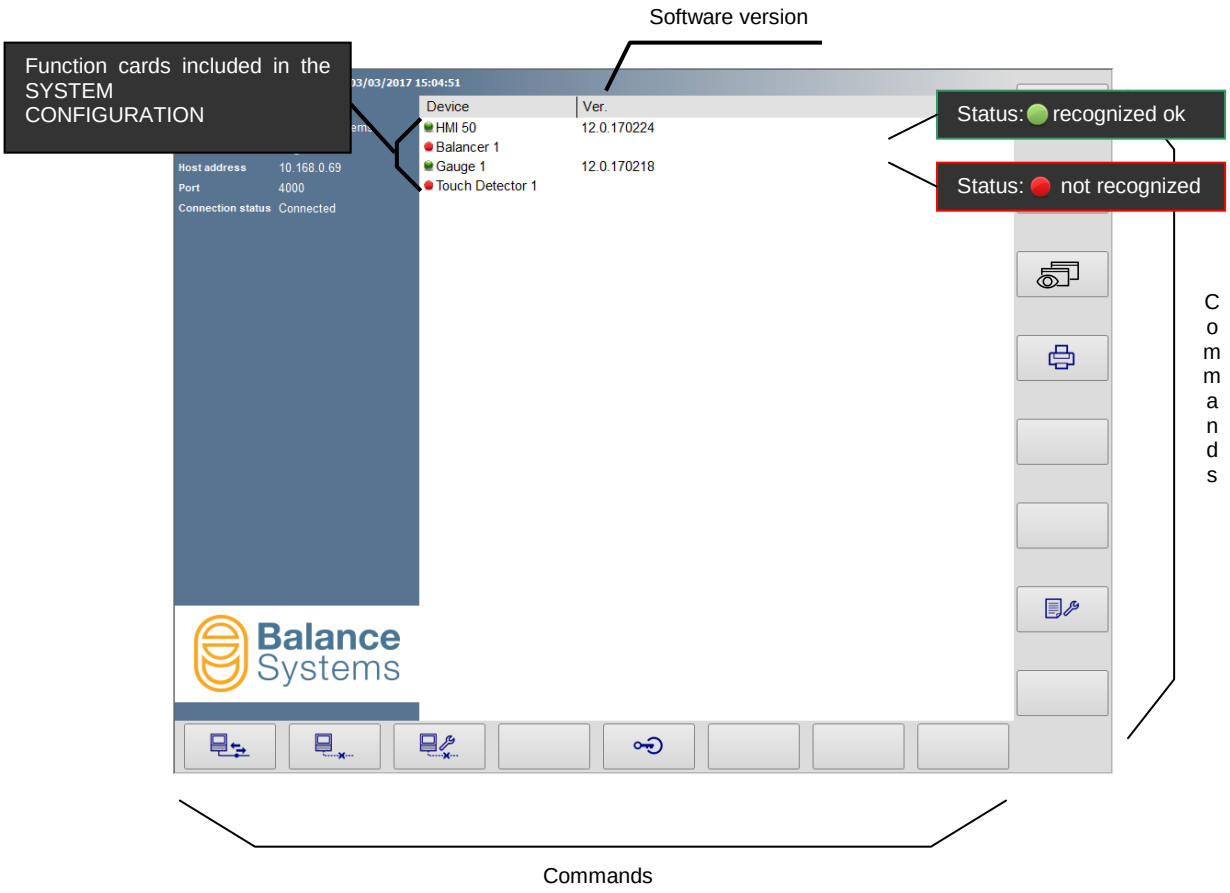
Screenshot	ID	Icon	Button	Description
	0017		Shift+F8	Exit

NOTES

Tooltips on command and status icon could appear as further help to the user

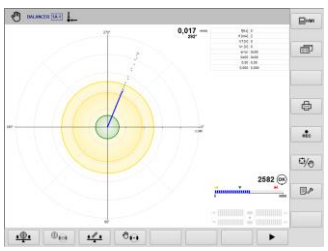
VMX5 HMI Functions

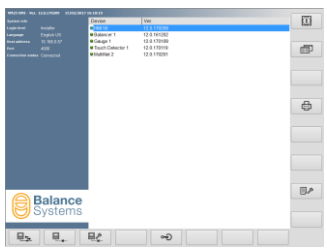
While the system starts up…



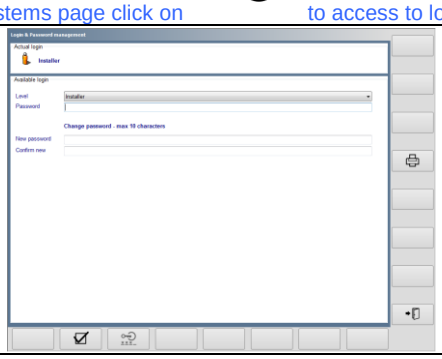
Access the System page

Click on HMI to access the System page

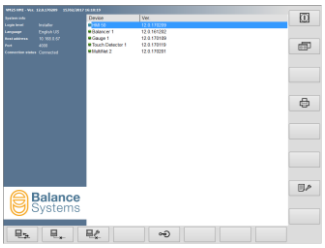


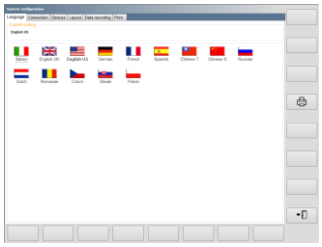


0002		F1	Connect to the system (scan)
0003		F2	Disconnect communication with the system
0004		F3	Go to SERVICE mode

Login access			
In the systems page click on  to access to login page			
	0015	F2	Confirm
	0006	F3	Change password
	0017	Shift + F8	Exit

Password	Name	Description
Login		
1	Observer	The system works in automatic mode only with no commands available for the user
1 2 9 4	Operator	The system works in automatic mode only. The user can access the commands available in automatic mode (i.e. LIMITS CORRECTION, GAUGE OFFSET, etc.). Depending upon the choices of the system installer, the manual mode for the balancer functions can be available for the user
1 4 3 2	Programmer	The system works both in automatic and in manual mode. The user has access the working parameters and some setup parameters
1 2 2 1	Installer	Full system control and access to all parameters
Config		
1 3 4 8 9	Output Logic	Enables changing of the digital output logic of the function cards

VMX5 HMI Setup access	
Starting from System page, press  to access the HMI system setup	
 	Language setup
	Connection setup
	Devices setup
	Layout setup
	Data recording setup
	Print setup
	VM Link setup

Language setup				
Select the language with one left click mouse				
	0017		Shift+F 8	Exit

Parameter modification

Parameters	Procedure to access
HMI PARAMETERS (System parameters)	Click on HMI to access the System page Click on to access the HMI parameters
FUNCTION CARD PARAMETERS - **Balancer** - **Touch Detector** - **Gauge** - **Multilink**	**NOTE**: the access to function card parameter is allowed in MANUAL MODE only Click on from the status page of the function card

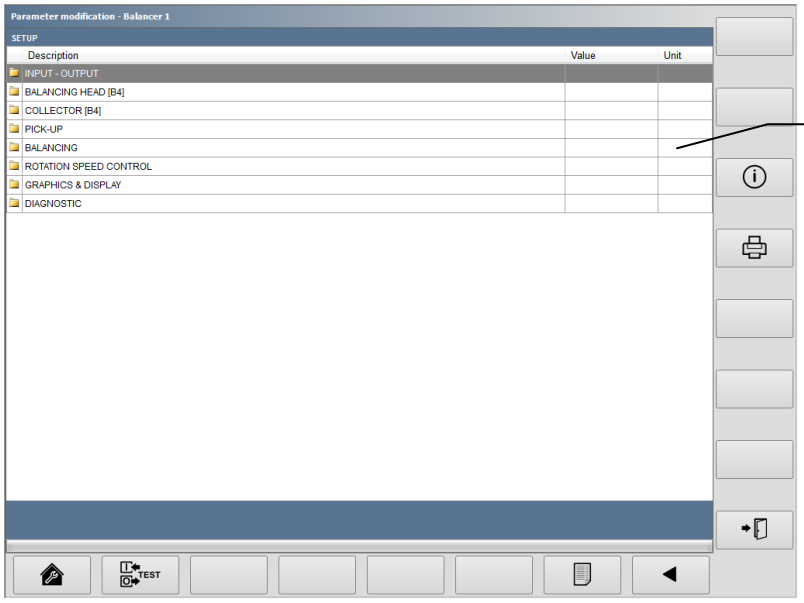
Parameter category	Description
WORK	Working parameters to perform the process under control. They are usually identified as PART-PROGRAM
SETUP	Full set of parameters to setup the input/output, to configure the sensors and actuators and to optimize the filters and algorithms
OPTION	List of options which can be installed for each function

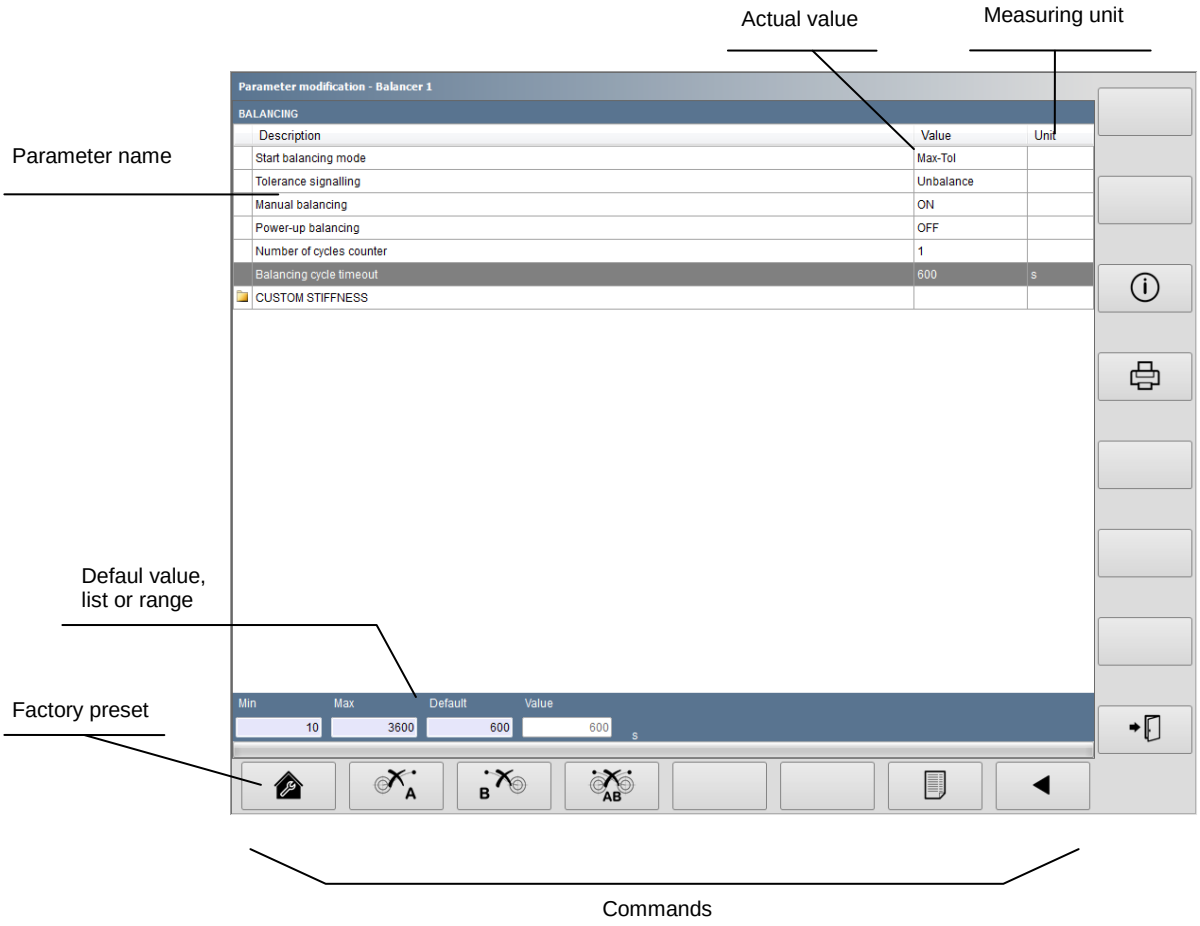
Parameter type	Property	Procedure to modify the value
Numerical	DEFAULT VALUE: factory presets RANGE: Min..Max MEASURING UNIT (if applicable)	▪ Double Click on value to modify ▪ Type the new value ▪ Press enter to apply the changes ***NOTE**: A value out of RANGE is rejected*
List of values	DEFAULT VALUE: factory presets LIST OF VALUES	▪ Double Click on value to access the list of values ▪ Click on the value to set it

Parameter page description

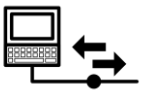
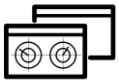
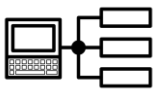
All the parameters are organized as a tree where the parameters are grouped into folders

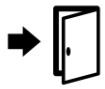
Click on folder to access the parameters page

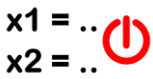
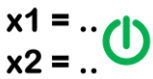


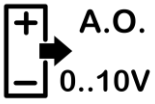
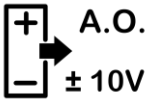


List of System commands

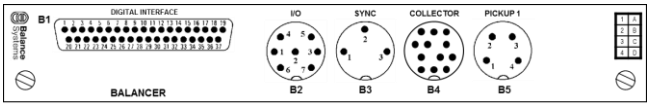
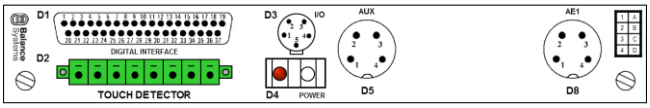
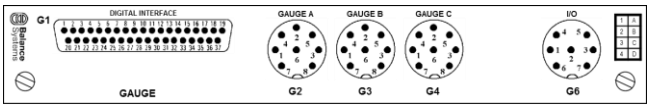
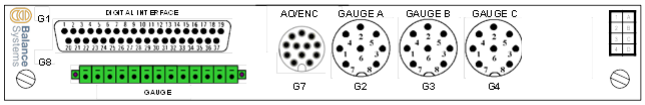
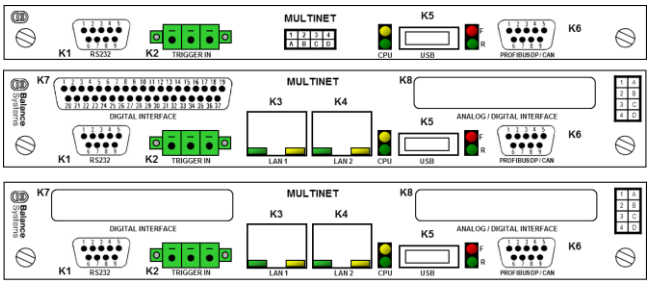
ID	Icon	Button	Description
0001		Shift + F1	Shut down VMX5 HMI application
0002		F1	Perform the connection between the VMX5 HMI and the control unit
0003		F2	Disconnect the VMX5 HMI application from the control unit
0004		F3	VMX5 HMI application goes in “sleep” mode in order to allow a remote connection for service operation
0005		F5	Change the login level. Enter a password is needed
0006		---	Change the password to login
0008		Shift + F3	Show additional information on parameters
0095		Shift + F3	It displays last opened viewer page
0010		Shift + F2	Change the displayed page between the devices included in the system configuration
0011		Shift + F4	Print screen on the default printer
0012		Shift + F6	Switch between Automatic and Manual mode
0013		Shift + F4	Access to parameters setting
0014		---	Access the system configuration
0015		---	Confirm the operation
0016		---	Cancel the request

ID	Icon	Button	Description
0017		Shift + F8	Exit from the function
0018		---	Exit from the function and save all data
0019		F1	Load the factory preset value
0020		F5	Show the parameters organization as Explorer
0021		F7	Show the parameters organization as list
0022		---	Resize the preview as whole page
0023		---	Restore or load data
0024		---	Backup or save data
0025		---	Change the setup
0026		---	Load the factory preset colors
0027		---	Move up the cursor
0028		---	Move down the cursor
0029		---	Move left the cursor
0030		---	Move right the cursor
0031		---	Increase the value of the parameter

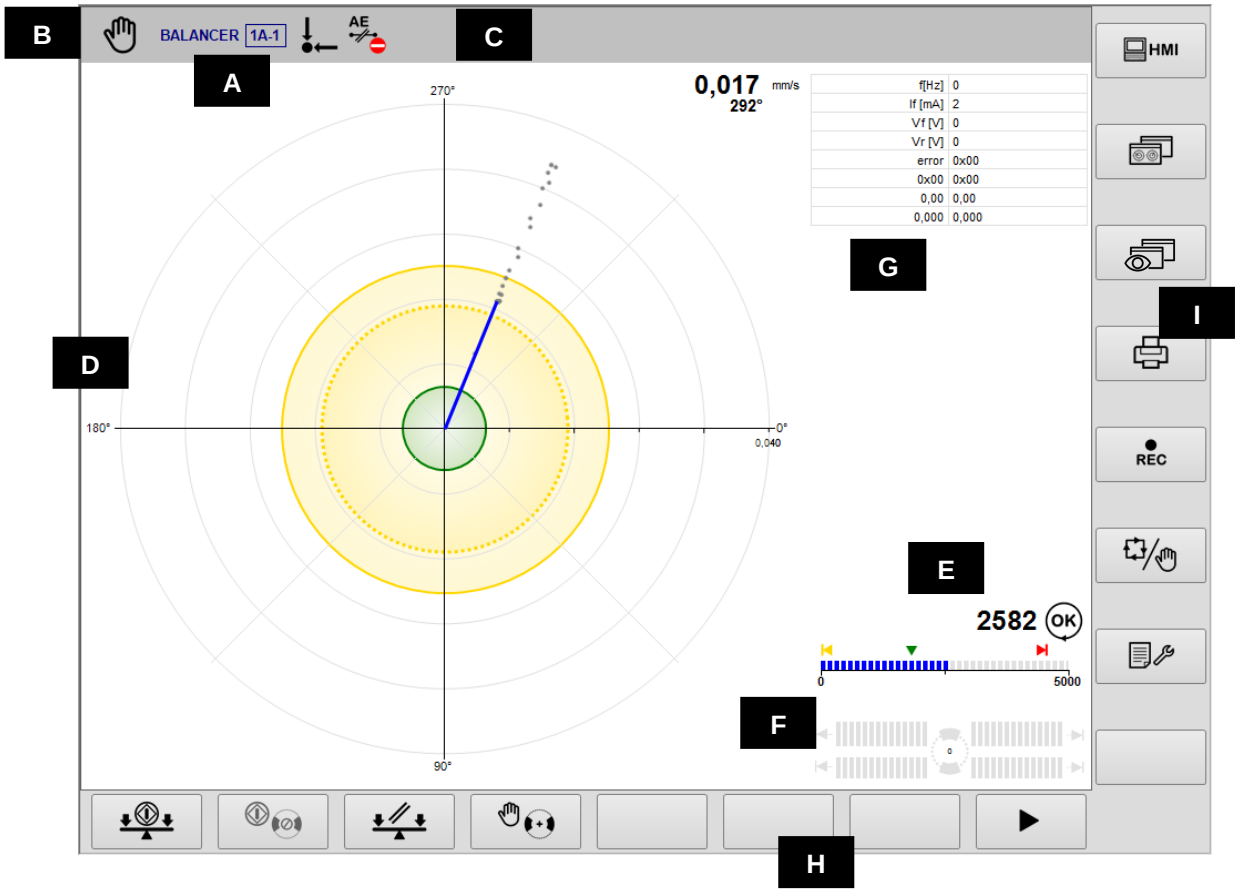
ID	Icon	Button	Description
0032		---	Decrease the value of the parameter
0033		F1	Show previous menu
0034		F8	Show next menu
0035		---	Access to Profibus / ProfiNET monitor function (“sniffer”)
0036		---	Access to digital I/O interface test function
0037		---	Access to digital I/O interface test function on connector K7
0038		---	Access to digital I/O interface test function on connector K8
0039		---	Set the digital output to “0” (low)
0040		---	Set the digital output to “1” (high)
0041		---	Select and activate the part program
0042		---	Reset or enable the device
0043		---	Switch off the display of diagnostic data
0044		---	Switch on the display of diagnostic data
0045		---	Switch off
0046		---	Switch on

ID	Icon	Button	Description
0047		---	Start
0048		---	Stop
0049		---	Lock the selected parameter. Only the login as “installer” has the rights to unlock the data
0050		---	Unlock the selected parameter
0051		---	Access to analog output calibration procedure
0052		---	Access to analog output calibration procedure
0053		---	Start the test cycle No.1
0054		---	Start the test cycle No.2
0057		---	Zoom in
0058		---	Zoom out
0059		Shift + F5	Start the data recording
0060		Shift + F5	Stop the data recording

Device recognizing

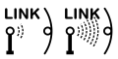
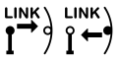
Device card layout	
	Balancer [BN type]
	Touch detector [TD type]
	Gauge [GA type]
	Gauge [NG type]
	Multinet [MN Type]

1 PLANE BALANCER [BN type]



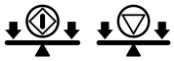
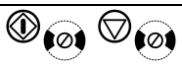
A. Current device & Part-Program
B. Operating mode (Automatic / Manual). Blinks while cycle in progress
C. Area reserved to status icons.
D. Graphic area to rappresent the unbalance diagram:
   - Diagram
   - Programmed tolerance limits
   - Unbalance value
E. Spindle rotation speed diagram: rotation status, limits.
F. Balancing head diagram. The indication in the bar graphs are proportional to the speed of the weights. The symbol "⇥I" indicates that the two compensation weights are in contact.
G. Messages and diagnostic data display area
H. Horizontal command line, accessible by [Fx] buttons.
I. Vertical command line, accessible by [Shift+Fx] buttons.

Status signalling

Unbalance		
3001		Unbalance inside min tolerance
3002		Unbalance out of tolerance
3022		ALARM: Max vibration
Spindle rotation speed		
3008		Spindle steady
3004		Spindle at nominal speed
3005		Spindle not at nominal speed
3006		ALARM: Spindle speed over max limit
3007		ALARM: Rotation speed fault
NoLink collector		
3031		Warning: link impossible
3023 3028		Communication link in progress… (animated)
3029 3030		Link optimization in progress…
3032		Link OK
3015		WARNING: Collector misaligned
3010		Warning: current limit reached on static part
3013		Warning: current limit reached on rotating part
3009		ALARM: Temperature on static part
3012		ALARM: Temperature on rotating part
3011		Warning: static part error or fault
3014		Warning: rotating part error or fault
3033		Warning: Active AE link impossible
3034		Active AE sensor OK
3035		Warning: Active AE sensor not ready

Balancing head		
3017		Neutral position reached
3019		Warning: neutral cycle error or fault
3018		Warning: neutral cycle impossible
3021		Warining: Max compensation reached
3020		Warning: motors error or fault >> Neutral cycle required
Accelerometer (pick-up)		
3003		ALARM: Pickup error or fault
Balancing cycle		
3039		WARNING: balancing cycle impossible
3038		WARNING: Balancing timeout expired
General		
1004		Generic error or fault
Brushes collector		
3016		Brushes collector: Power ON
3036		Ring collector: Electrovalve ON

Commands

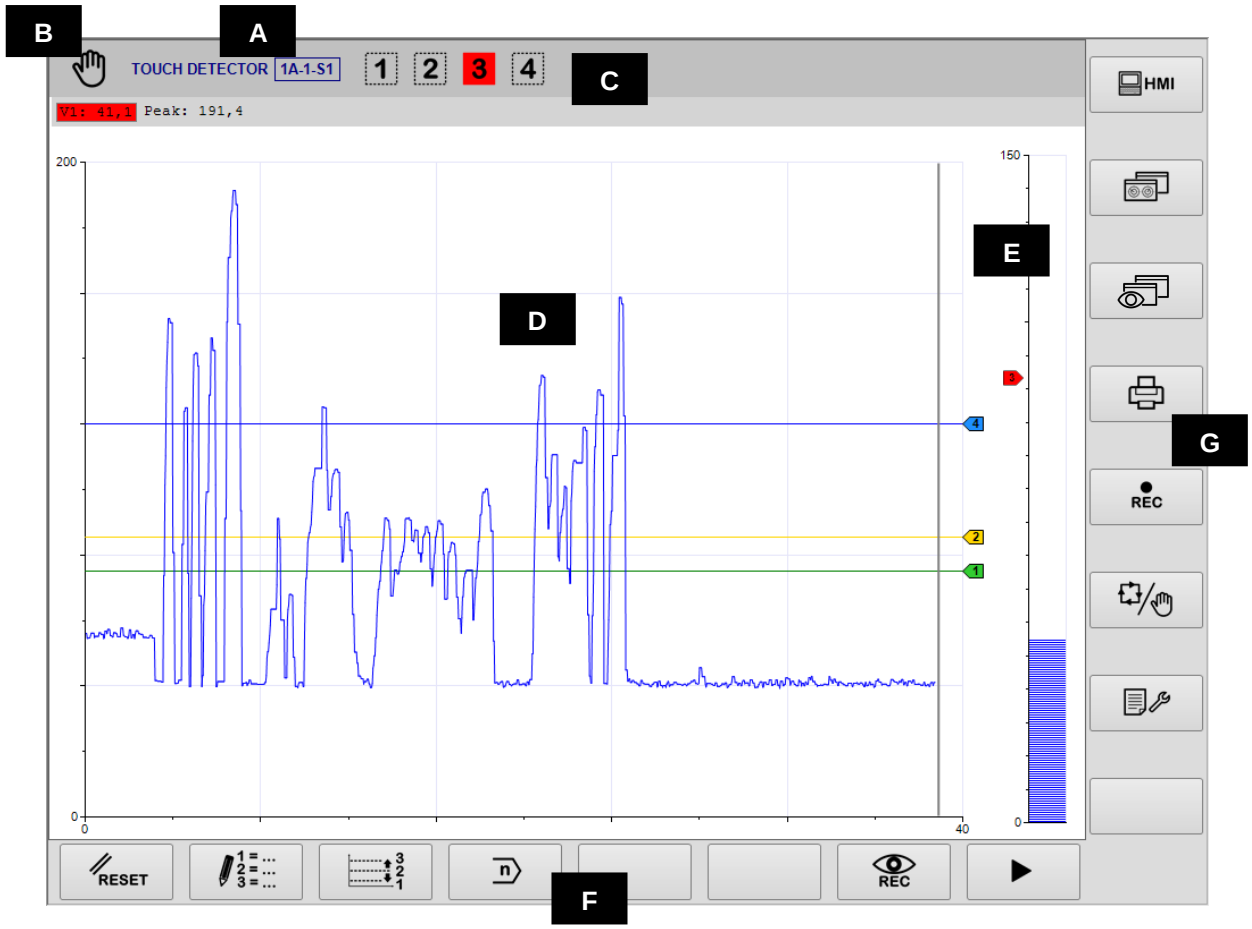
Main commands			
2001 2002		F1	Start/ Stop automatic balancing cycle [1 plane]
2038 2039		F2	Start/Stop automatic neutral positioning cycle [weights @ 180°]
2015		F4	Manual driving of balancing head motors
2044		F2	IF ENABLED - Start guided manual balancing procedure [1 plane] (PRE-BALANCING)
2014		F7	Unbalance diagram
2043 2042		F2	Collector ON/OFF

				Manual balancing procedure [1 plane]			
				2049		-	Function to learn the weight
2046		-	Balancing weight acquisition	2047		-	Stop balancing weight acquisition
2062		-	Weight change	2050		F1	Weight position correction
0024		-	Data save	2048		-	Ignore

 Manual driving of balancing head motors							
COMBINED mode				SINLGE mode			
2031		F1	Cross forward	2020		F1	Weight 1 forward
2030		F2	Cross backward	2019		F2	Weight 1 backward
2032		F3	Parallel backward	2022		F3	Weight 2 forward
2033		F4	Parallel forward	2021		F4	Weight 2 backward
2018		F6	Switch to “Single mode”	2029		F6	Switch to “Combined mode”

Commands in Parameter Setup			
0036		F2	DIGITAL INTERFACE test [Connector B1]
0051		F2	0..10V analog output calibration [Connector B2]

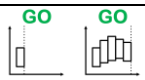
TOUCH DETECTOR [TD type]



A. Device, Section, Setup, Part-Program
B. Operating mode (Automatic / Manual). Blinks when cycle in progress
C. Area reserved to status icons.
D. Graphic area to rappresent the diagrams of the sources used to activate the limits 1, 2 and 3. The number of the diagrams displayed depends on the active part-program.
   - Source vs time diagram
   - Programmed limits
   - Status of the programmed limits
   - Numerical value of the sources

   Sources values:
   a = absolute
   i = incremental
   d = delta
   M = max (peak)
E. Graphic area to rappresent the source for an independent control of the limit 3. In this case the source is rappresented with a bar graph.
F. Horizontal command line, accessible by [Fx] buttons.
G. Vertical command line, accessible by [Shift+Fx] buttons.

Status signalling

Outputs		
5001 5004 5007 5010		Output limits activated
5003 5006 5009 5012		Output limits inactiveted
FFT Analysis		
5014		FFT in run mode
5015		FFT in peak detection mode
5013		FFT ZERO active
Envelope		
5056		No stored time duration
5043		Time duration learning in process
5049		Time duration learning error
5050		Time duration learning correct executed
5030		No stored master
5042		Master learning in process
5054		Master learning error
5053		Master learning good
5031		Process timeout
5032		Autostart timeout
5034		Envelope in progress

5046		Process stopped
5040		Zone over tolerance
5041		Zone below tolerance
5055		Zones out of tollerance
5044		Ip max
5047		Ip min
5039		Ip crash
5051		Ip max – min
5028		Envelope End
5033		Envelope good
5045		Process over tolerance
5048		Process below tolerance
5052		Process out of tolerance
Sensor		
5019		WARNING: Acoustic Emission sensor No.1 not ready
5021		WARNING: Acoustic Emission sensor No.2 not ready
5017		WARNING: Power sensor not ready
5027		Warning: AUX sensor not ready
5018		Warning: Power sensor error or fault
5020		Warning: AE1 sensor error or fault
5022		Warning: AE2 sensor error or fault
5028		Warning: AUX sensor error or fault

Glossary
AE = Acoustic Emission
Aux = Auxiliary source
P = Power
V = Variable

Commands

Commands in Automatic Mode			
4001		F1	Limit 1 correction
4002		F2	Limit 2 correction
4003		F3	Limit 3 correction
4004		F4	Limit 4 correction
Commands in Manual Mode			
0042		F1	Reset / Enable
4006		F2	Part-program formula setup
4005		F3	Quick limit correction
0041		F4	Part-program select
4061		F2	V1 variable setup
4064		F3	V2 variable setup
4067		F4	V3 variable setup
4070		F5	V4 variable setup
4079		F6	Power sensor setup

 **Limits correction**			
NOTE: the contents of the menu depends on the formula of the active part-program			
aV x		aP x	Absolute limit correction
iV x		iP x	Incremental limit correction
dV x		dP x	Delta limit correction

Edit Part-Program: FORMULA

	Term					Threshold	Operator
Output	**Digital Output signalling**	**Source elaboration**	**Source**	**Channel**	**Compare**		
Limit 1 = Limit 2 = Limit 3 = Limit 4 =	[N] = No Latch [L] = Latch [E] = Edge	[a] = absolute [i] = incremental [d] = delta	V P	1..8	> <	xxx	+ = logical OR with next term . = end
	Term Protection					**Threshold protection**	

Example: The process uses acoustic emission and power sensors simultaneously

Limit 1 = N iV 1 > 30.0 + N iP 1 > 15

Limit 1 is used as GAP ELIMINATION based on incremental value of variable 1 (greater than 30%) OR power channel 1 (greater than 15%). The digital output signal is NO LATCHED (free running)

Limit 2 = L a-- > 0.0

Limit 2 not used

Limit 3 = L aP 1 > 80.0

Limit 3 is used as ANTI-CRASH detection based on the absolute istantaneous value of the power channel 1 (greater than 80%). The digital output signal is LATCHED until the next reset.

Limit 4 = L a-- > 0.0

Limit 4 not used

NOTE: Terms or Thresholds which appears in "reverse mode" are protected by the system installer

Example: Limit 1 = N iAE 1 > 30.0 + N iP 1 > 15

The term "N iP 1 >" is protected and can only be modified by system installer only.

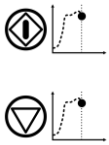
Commands in Power input Setup

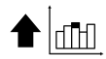
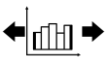
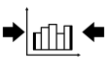
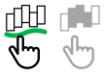
4080		F2	Config power sensor network
4081	kW 100%	F4	Nominal power setup
4073	RMS	F3	RMS filter setup

V1 V2 V3 V4 Commands in Vx Variable Setup							
4046	FFT					F1	FFT Reset
4047	FFT	4045	FFT PEAK			F2	FFT in run-time/peak-detector mode
4050	FFT	4049	FFT			F3	FFT save/reset background noise offset
4056	B					F4	Input gain setup
		4057	B			F1	Reduce input gain
		4058	B			F3	Increase input gain
		0015				F6	Confirm
4030						F5	Digital filters setup
		4031	1			F2	Band-pass filter No.1
		4033		4032		F4	Enable/Disable band-pass filter No.1
				4039		F5	Reduce lower frequency
				4040		F6	Increase upper frequency
				4037		F7	Reduce upper frequency
				4038		F8	Increase upper frequency
		4034	2			F3	Band-pass filter No.2
		4036		4035		F4	Enable/Disable band-pass filter No.2
				4043		F5	Reduce lower frequency
				4044		F6	Increase lower frequency
				4041		F7	Reduce upper frequency
				4042		F8	Increase upper frequency
4048	FFT					F2	FFT setup
		4071	AEx Vx			F3	Link AE source to variable
		4073	RMS			F4	RMS filter setup
		4072	Vx 100%			F5	Full scale of the variable setup
		4076	AE	4075	AE	F6	Enable sensor ready check function
		4074				F7	Downsample filter for incremental mode
		4082	No. RMS			F8	Number of samples for RMS input filter

V1 V2 V3 V4 Commands in Vx Variable Setup							
4051						F5	Reduce frequency of the working window
4052						F6	Increase frequency of the working window
4053						F4	Working frquency windows gain setup
		4054				F1	Reduce gain into working window
		4055				F3	Increase gain into working frequency
		0015				F6	Confirm

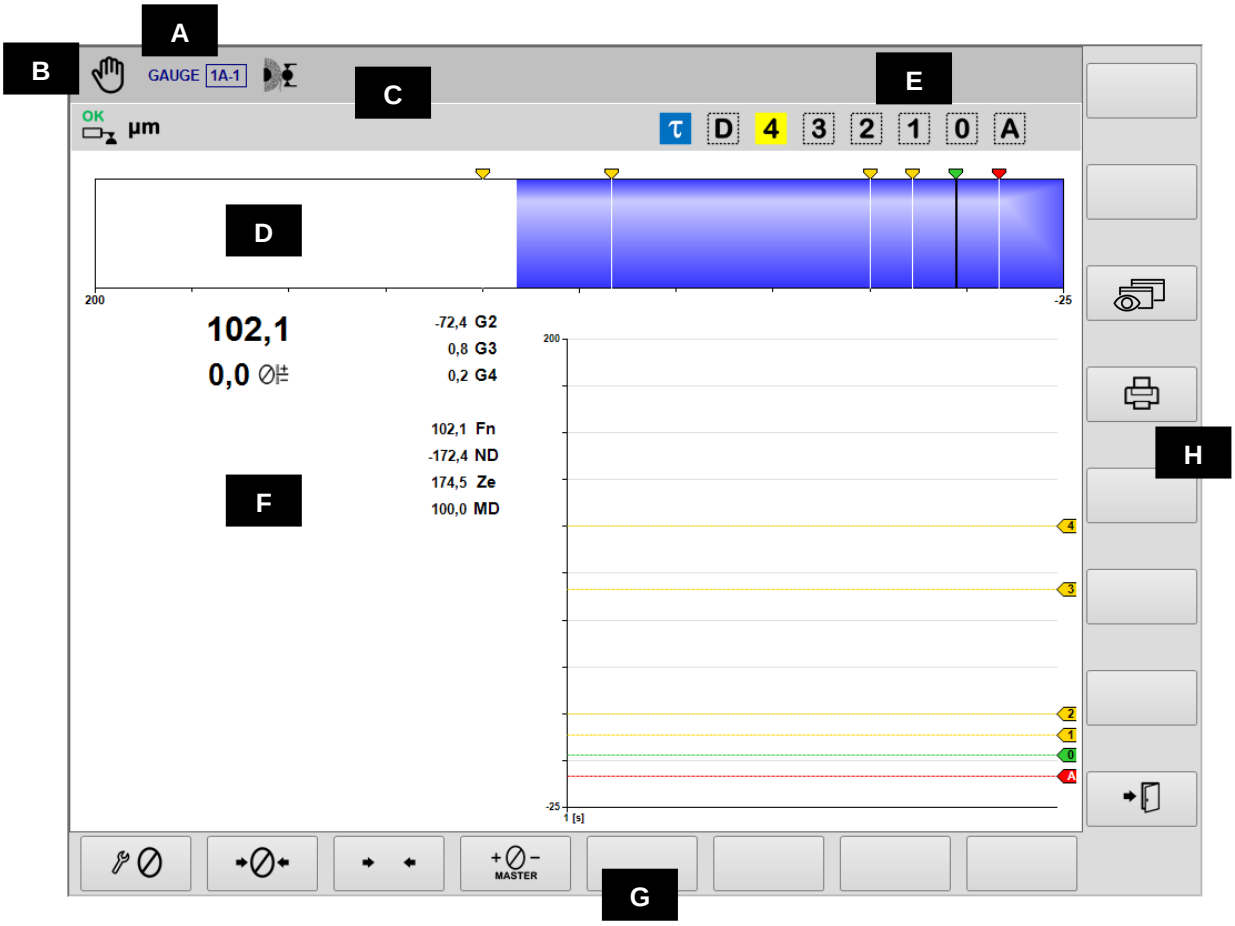
Commands in Parameter Setup			
0036		F2	Digital interface test
0051		F2	0..10V analog output calibration [Connector B2]

Envelope commands in Manual Mode			
0042		F1	Reset / Enable
4106 4107		F2	Start process Stop process
4109 4110		F3	Start learning Stop learning
4098		F4	Master delete
4099		F7	Edit mode

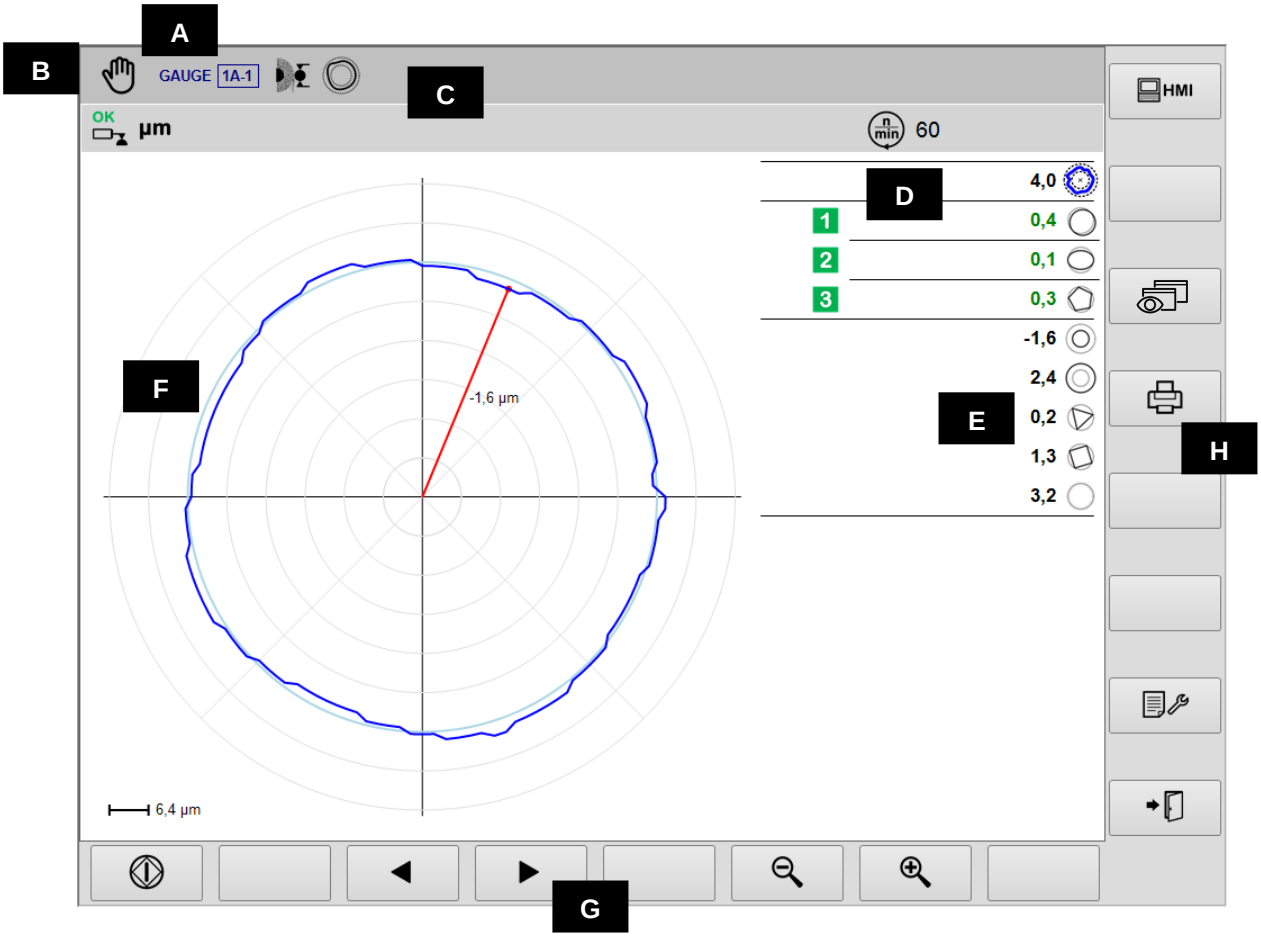
Commands in edit mode page			
4104		F1	Move left and select
4105		F2	Move right and select
4103		F3	Increase top selected
4097		F4	Decrease top selected
4102		F5	Increase bottom selected
4096		F6	Decrease bottom selected
4111 4112	 	F7	Disable selected Enable selected
4095		F1	Decrease top curve
4101		F2	Increase top curve
4094		F3	Decrease bottom curve
4100		F4	Increase bottom curve
4114		F5	Stretch out
4113		F6	Stretch in
4115 4116	 	Shift + F3	Enable draw mode Enable selected mode
0093		Shift + F5	Undo
0094		Shift + F6	Redo
4108		Shift + F7	Master save
0034		F8	Go to next menu

GAUGE [GA type]

In-Process Gauging and In-Process Gauging with Roundness Analysis



A. Current device, Section & Part-Program
B. Operating mode (Automatic / Manual). Blinks when cycle in progress
C. Area reserved to status icons.
D. Ruler
E. Output signalling
F. Graphic area to rappresent the diagrams of the sources
   - Dimension diagram
   - Output commands status
   - Gauging head status
   - Numerical value of the dimension
   - Numerical value of the programmed offset
   - Rotation speed of the workhead
   - Numerical value of each gauging transducer
G. Command line, accessible by [Fx] buttons.
H. Vertical command line, accessible by [Shift+Fx] buttons.

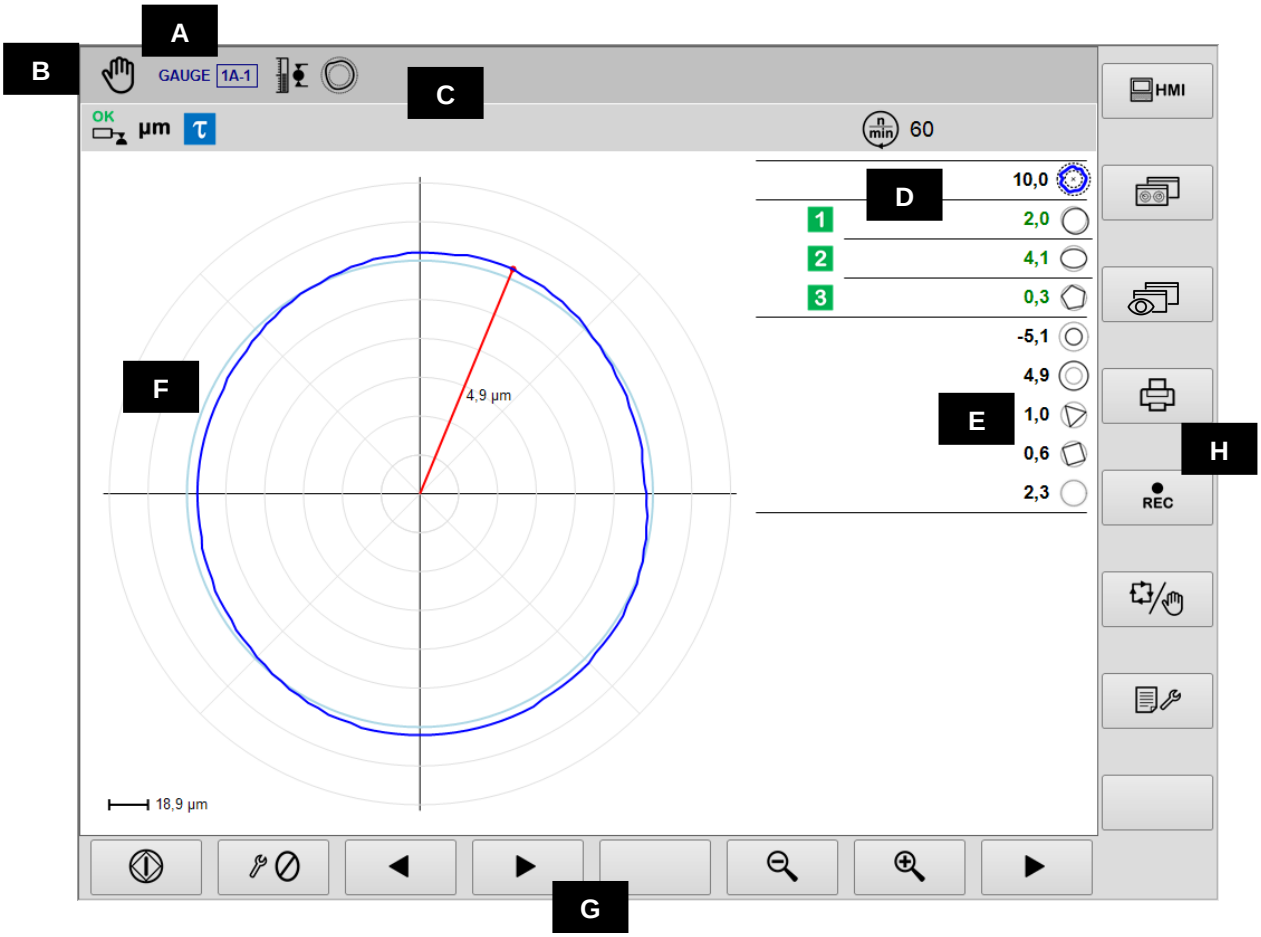


A. Current device, Section & Part-Program
B. Operating mode (Automatic / Manual). Blinks when cycle in progress
C. Area reserved to status icons.
D. Output signalling
E. Shape components value
F. Graphic area to rappresent the diagrams of the sources
   - Roundness diagram
   - Output commands status
   - Value of the shape components
   - Rotation speed of the workhead
   - Measuring unit
G. Command line, accessible by [Fx] buttons.
H. Vertical command line, accessible by [Shift+Fx] buttons

Pre/Post-Process Gauging

A. Current device, Section & Part-Program
B. Operating mode (Automatic / Manual). Blinks when cycle in progress
C. Area reserved to status icons.
D. Dimension index
E. Output signalling
F. Graphic area to rappresent dimension, offset, workhead rotation speed and transducers value
G. Command line, accessible by [Fx] buttons.
H. Vertical command line, accessible by [Shift+Fx] buttons.

Post-Process Roundness & Shape Analysis



A. Current device, Section & Part-Program
B. Operating mode (Automatic / Manual). Blinks when cycle in progress
C. Area reserved to status icons.
D. Output signalling
E. Shape components value
F. Graphic area to rappresent the diagrams of the sources
   - Roundness diagram
   - Output commands status
   - Value of the shape components
   - Rotation speed of the workhead
   - Measuring unit
G. Command line, accessible by [Fx] buttons.
H. Vertical command line, accessible by [Shift+Fx] buttons

Status signalling

Outputs		
7036 7033 7030 7027 7039 7045	1 2 3 4 0 A	In-Process skip commands activated
7038 7035 7032 7029 7041 7047	1 2 3 4 0 A	In-Process skip commands resetted
7062 7065 7068	1 2 3	Post-Process Gauging or Roundness components out of tolerance
7060 7063 7066	1 2 3	Post-Process Gauging or Roundness components in tolerance
7024	τ	Start cycle delay active
7026	τ	Start cycle delay expired
7042	D	Dwell timer expired
7044	D	Dwell timer inactive
7048	KO	Run-out out of tolerance
7049	OK	Run-out in of tolerance
7050		Roundness & shape analysis impossible
Gauging		
7012		Part-program for in-process
7013		Part-program for post-process
7014		Part-program for flagging
7015		Part-program with roundness & shape analysis
7011		Synchronized gauge head
7010		Correction offset value
7016		Syncronized dimension
7001 7002	mil µm	Measuring unit: mil or µm
Dimension		
	OVR	Overrange
	MAX	Limite max

Transducers		
7017		Over-range
7018		Gauge head on mechanical stopper
7004	OK	Measuring position OK
7005	OK	Retraction OK
7006		Warning: Retraction impossible
7007		Warning: Retraction error
7008		Data hold
7009		Warning: Retraction error while data hold
7003		Warning: Gauge head error or fault
Roundness & Shape		
7051		Roundness error
7053		Extrenal deviation
7052		Internal deviation
7054		Eccentricity
7055		Ovality
7056		3-lobes component
7057		4-lobes component
7058		5-lobes component
7059		Shape residual

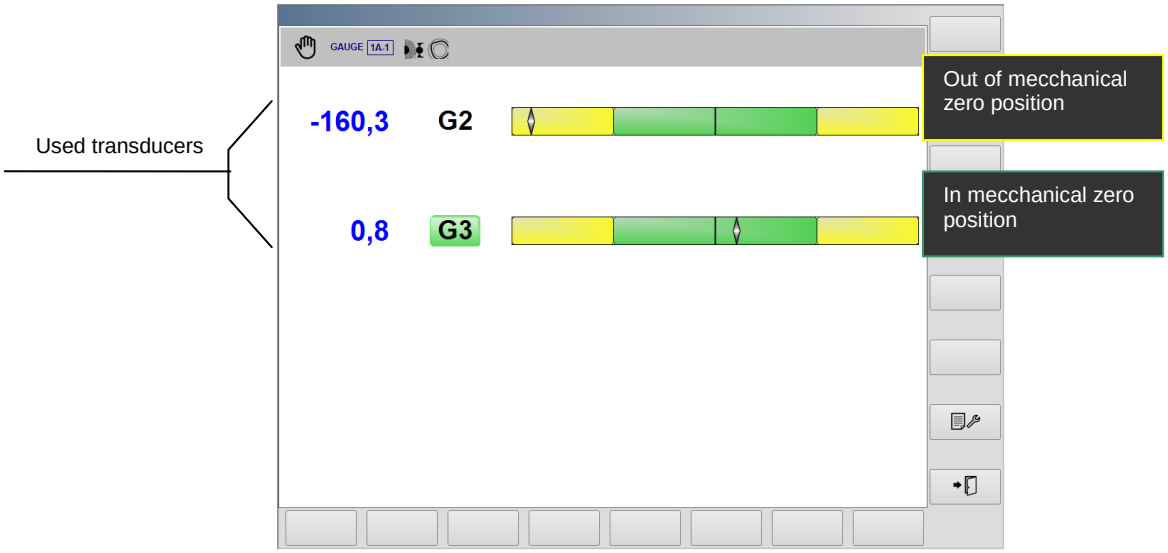
Commands

Commands in Automatic mode			
6003		F1	Offset increment
6002		F2	Offset decrement
6004		F3	Offset reset
0057 0058		F7	Zoom in / Zoom out
Commands in Manual mode			
0042		F1	Reset / Enable
6001		F2	Offset correction setup
6005		F3	Zeroing functions
6039		F5	Roundness & shape analysis functions
6013 6012		F6	Enable / Disable synchronized gauge head
0057 0058		F7	Zoom in / Zoom out

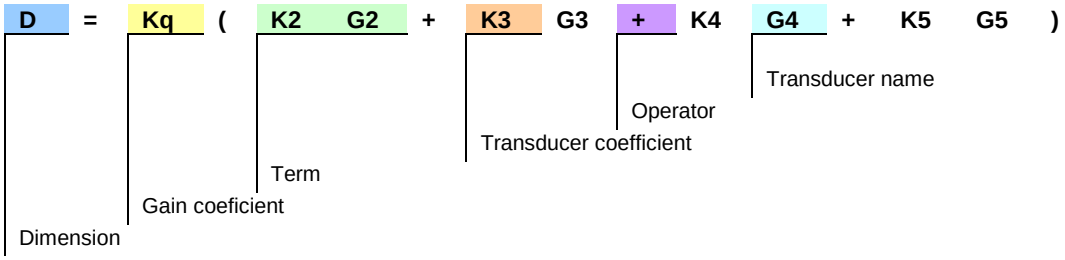
 Roundness			
0047		F1	Start
0048		F1	Stop
0033		F3	Previous
0034		F4	Next
0057		F7	Zoom in
0058		F6	Zoom out

 Zeroing			
6008		F1	Mechanical zeroing
6006		F2	Electrical zeroing
6007		F3	Reset electrical zero
6009		F4	Master deviation from zero setup

Mechanical zeroing



Part program: MEASURE FORMULA



Transducer name

The four controllable transducers have the following names associated to the card inputs: G2, G3, G4, G5

Transducer coefficient

The role of the coefficient K2..K5 is that of carrying out a weighing correction of the reading done by the transducers. The value of such coefficients depends on the sensitivity and the mechanical construction of the transducer.
Normally the value of these coefficients is imposed at 1.0. It is possible to determine them with the following procedure:

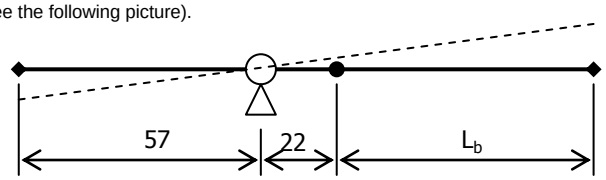
- Execute a zero on a reference surface position
- Insert a master piece with a known thickness, i.e. 0.2 mm, in between the tip and the reference surface;
- Read the displayed dimension, i.e. 0.22 mm
- Calculate the Kx coefficient (related to the current transducer: G2..G5) = Master dimension / Red dimension = 0.2 / 0.22 = 0.9091;
- Repeat this procedure for each transducer used

Operator

Identifies the type of link between the various transducers:
‘‘+’’ = The reading of the transducer that follows is added
‘‘-’’ = The reading of the transducer that follows is subtracted
‘‘)’’ = Terminates the formula.

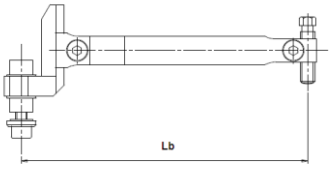
Gain coefficient (finger ratio)

The coefficient Kq determines an equalisation of the quote based on the finger ratio, i.e. the ratio between the distance gauging tip-fulcrum of the head and transducer-fulcrum of the head (see the following picture).



$$Kq = (Lb + 22) / 57$$

where Lb is the finger length.

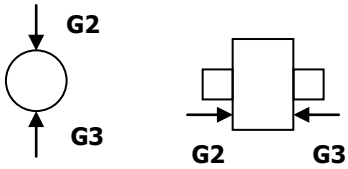


In the following table are displayed the gain coefficient for the standard finger set

Finger ratio	
Finger lenght Lb [mm]	**Kq for Top Gauge 200**
56	1.368
70	1.614
100	2.140
120	2.491

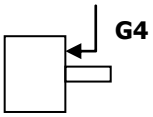
Part program: MEASURE FORMULA (…continue)

Example 1 – Diameter or thickness gauging with G2 and G3 transducer, 70 mm fingers lenght



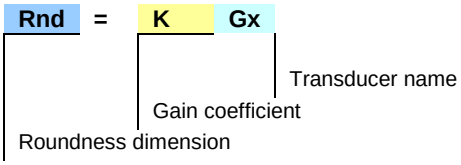
Formula: D = 1.614 (1.0 G2 + 1.0 G3)

Example 2 – Position gauging using the transducer G4 and 56 mm finger lenght



Formula: D = 1.368 (1.0 G4)

Part program: ROUNDNESS FORMULA



The gauging of roundness is defined by setting a formula, of single term, where one of the four transducers is selected (G2, G3, G4, G5). The structure of the formula is as follows:

Rnd = K Gx where x = 2, 3, 4, 5.

the meaning of coefficient K can be summarised: K = Kq Kx (see measure formula).
The role of coefficient K is that of weighing up the reading made by the transducer. The coefficient value is normally supplied in the technical sheet for the gauging head, since it depends on the sensitivity and mechanical construction of the transducer.

The value of this coefficient can be set using the previously described procedure for the measure formula.

Example: Formula for finger Lb = 70mm : **Rnd = 1.614 G2**

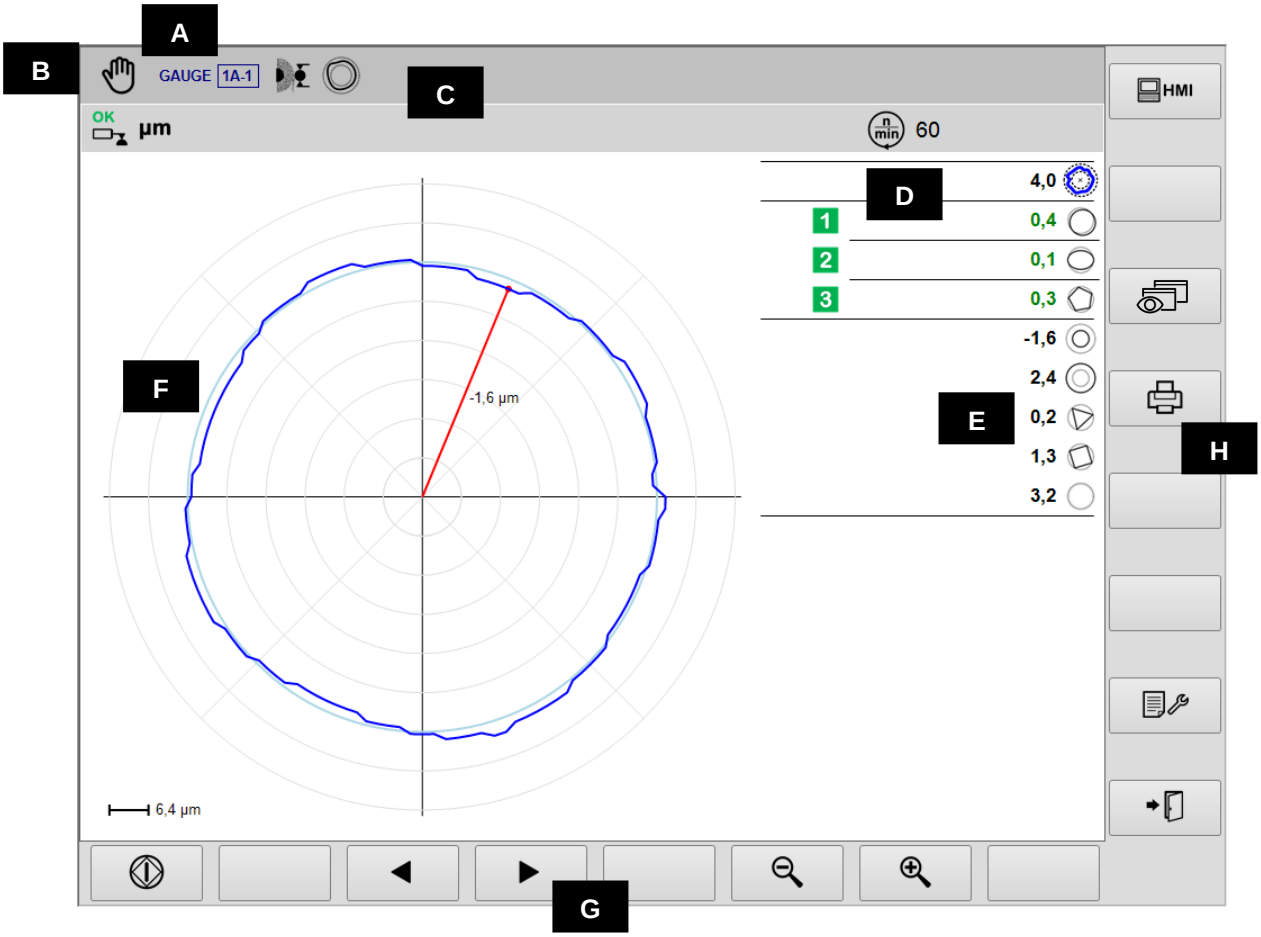
Commands in Gx Transducers setup			
6041		F1	TG200 connect Every time that a gauging head, TG200-LG type, is connected with the system already on, it is necessary to execute the command for it to be acknowledged. In case, after the command, the corresponding configuration parameters are not displayed on the screen, it means the gauge head is not correctly connected or is faulty

Commands in Parameter Setup			
0036		F2	Digital interface test

GAUGE [NG type]

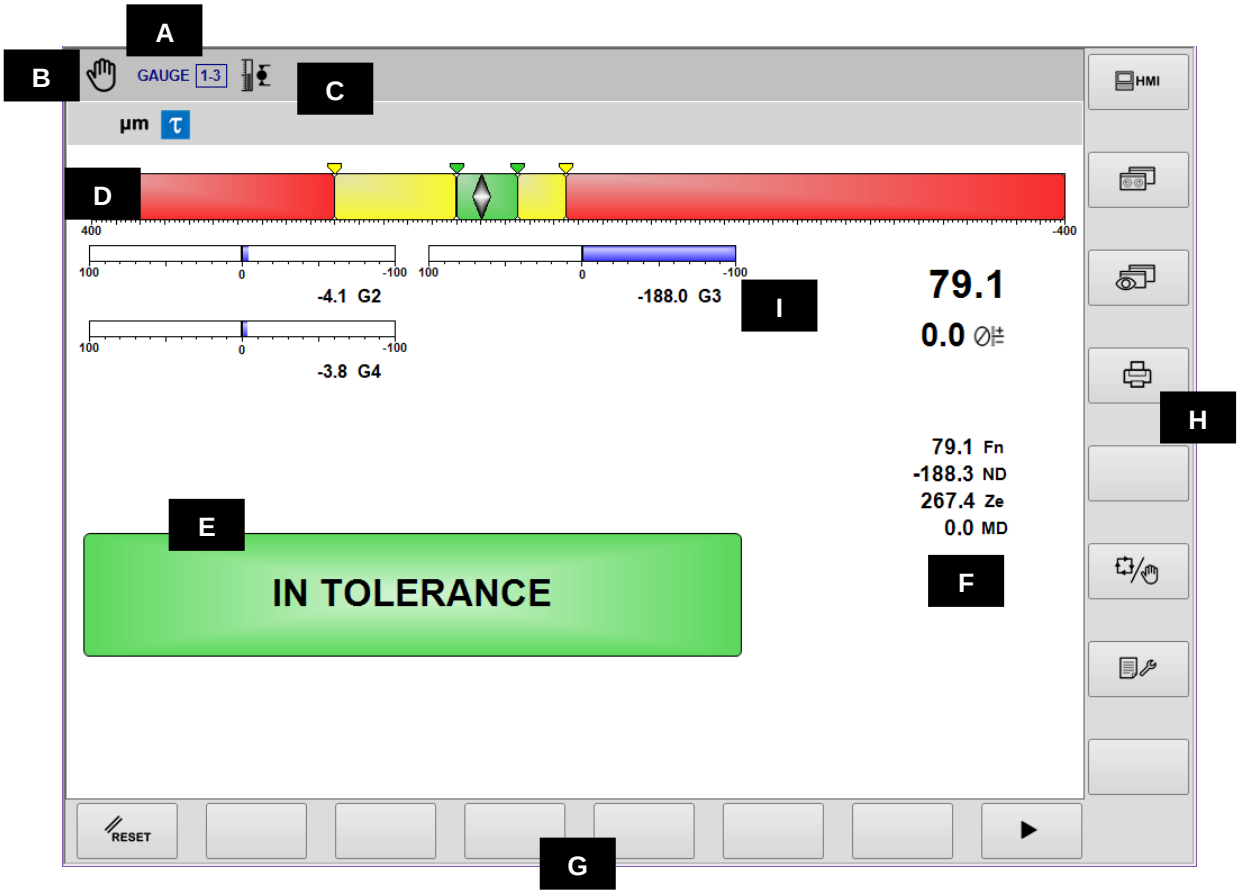
In-Process Gauging and In-Process Gauging with Roundness Analysis

A. Current device, Section & Part-Program
B. Operating mode (Automatic / Manual). Blinks when cycle in progress
C. Area reserved to status icons.
D. Ruler
E. Output signalling
F. Graphic area to rappresent the diagrams of the sources
   - Dimension diagram
   - Output commands status
   - Gauging head status
   - Numerical value of the dimension
   - Numerical value of the programmed offset
   - Rotation speed of the workhead
   - Numerical value of each gauging transducer
G. Command line, accessible by [Fx] buttons.
H. Vertical command line, accessible by [Shift+Fx] buttons.
I. Gauge heads rulers



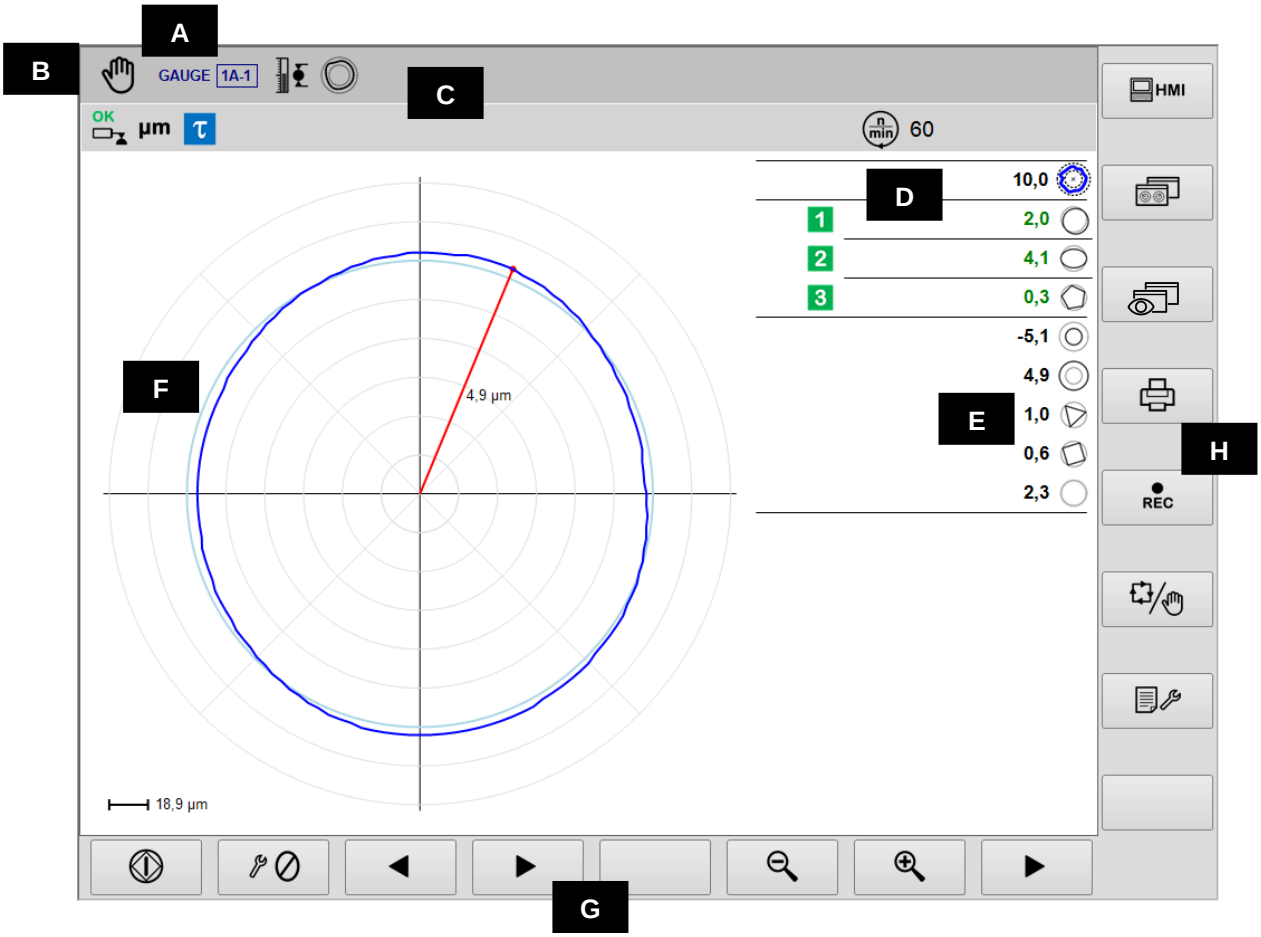
A. Current device, Section & Part-Program
B. Operating mode (Automatic / Manual). Blinks when cycle in progress
C. Area reserved to status icons.
D. Output signalling
E. Shape components value
F. Graphic area to rappresent the diagrams of the sources
   - Roundness diagram
   - Output commands status
   - Value of the shape components
   - Rotation speed of the workhead
   - Measuring unit
G. Command line, accessible by [Fx] buttons.
H. Vertical command line, accessible by [Shift+Fx] buttons

Pre/Post-Process Gauging



A. Current device, Section & Part-Program
B. Operating mode (Automatic / Manual). Blinks when cycle in progress
C. Area reserved to status icons.
D. Dimension index
E. Output signalling
F. Graphic area to rappresent dimension, offset, workhead rotation speed and transducers value
G. Command line, accessible by [Fx] buttons.
H. Vertical command line, accessible by [Shift+Fx] buttons.
I. Gauge heads rulers

Post-Process Roundness & Shape Analysis



A. Current device, Section & Part-Program
B. Operating mode (Automatic / Manual). Blinks when cycle in progress
C. Area reserved to status icons.
D. Output signalling
E. Shape components value
F. Graphic area to rappresent the diagrams of the sources
   - Roundness diagram
   - Output commands status
   - Value of the shape components
   - Rotation speed of the workhead
   - Measuring unit
G. Command line, accessible by [Fx] buttons.
H. Vertical command line, accessible by [Shift+Fx] buttons

Status signalling

Outputs		
7036 7033 7030 7027 7039 7045	1 2 3 4 0 A	In-Process skip commands activated
7038 7035 7032 7029 7041 7047	1 2 3 4 0 A	In-Process skip commands resetted
7062 7065 7068	1 2 3	Post-Process Gauging or Roundness components out of tolerance
7060 7063 7066	1 2 3	Post-Process Gauging or Roundness components in tolerance
7024	τ	Start cycle delay active
7026	τ	Start cycle delay expired
7042	D	Dwell timer expired
7044	D	Dwell timer inactive
7048	KO	Run-out out of tolerance
7049	OK	Run-out in of tolerance
7050		Roundness & shape analysis impossible
Gauging		
7012		Part-program for in-process
7013		Part-program for post-process
7014		Part-program for flagging
7015		Part-program with roundness & shape analysis
7011		Synchronized gauge head
7010		Correction offset value
7016		Syncronized dimension
7001 7002	mil µm	Measuring unit: mil or µm
Dimension		
	OVR	Overrange
	MAX	Limite max

Transducers		
7017		Over-range
7018		Gauge head on mechanical stopper
7004	OK	Measuring position OK
7005	OK	Retraction OK
7006		Warning: Retraction impossible
7007		Warning: Retraction error
7008		Data hold
7009		Warning: Retraction error while data hold
7003		Warning: Gauge head error or fault
Roundness & Shape		
7051		Roundness error
7053		Extrenal deviation
7052		Internal deviation
7054		Eccentricity
7055		Ovality
7056		3-lobes component
7057		4-lobes component
7058		5-lobes component
7059		Shape residual

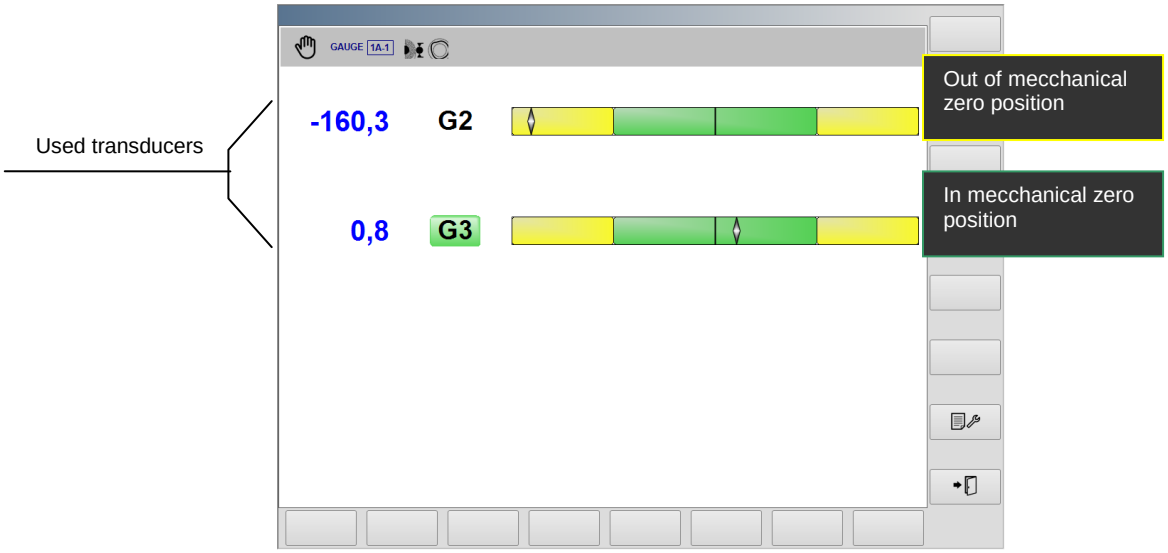
Commands

Commands in Automatic mode			
6003		F1	Offset increment
6002		F2	Offset decrement
6004		F3	Offset reset
0057 0058		F7	Zoom in / Zoom out
Commands in Manual mode			
0042	RESET	F1	Reset / Enable
6001		F2	Offset correction setup
6005		F3	Zeroing functions
6039		F5	Roundness & shape analysis functions
6013 6012	G2 .. G5 G2 .. G5	F6	Enable / Disable synchronized gauge head
0057 0058		F7	Zoom in / Zoom out

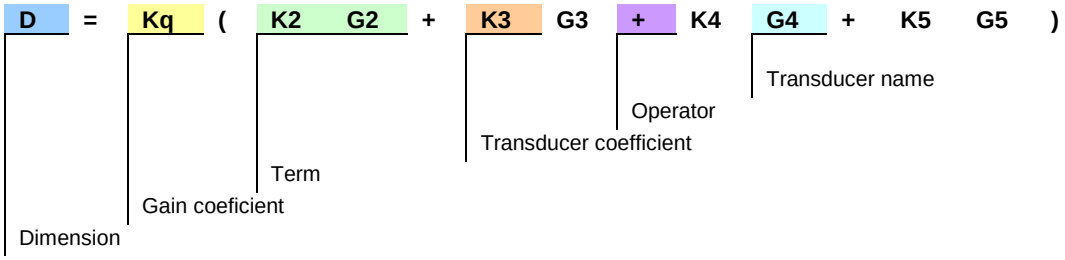
Roundness			
0047		F1	Start
0048		F1	Stop
0033		F3	Previous
0034		F4	Next
0057		F7	Zoom in
0058		F6	Zoom out

Zeroing			
6008		F1	Mechanical zeroing
6006		F2	Electrical zeroing
6007		F3	Reset electrical zero
6009	MASTER	F4	Master deviation from zero setup

Mechanical zeroing



Part program: MEASURE FORMULA



Transducer name

The four controllable transducers have the following names associated to the card inputs: G2, G3, G4, G5

Transducer coefficient

The role of the coefficient K2..K5 is that of carrying out a weighing correction of the reading done by the transducers. The value of such coefficients depends on the sensitivity and the mechanical construction of the transducer.
Normally the value of these coefficients is imposed at 1.0. It is possible to determine them with the following procedure:

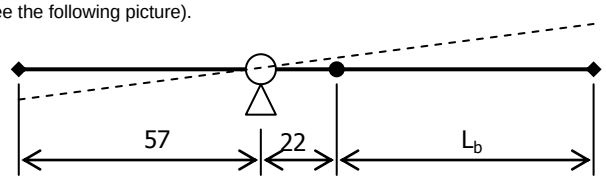
- Execute a zero on a reference surface position
- Insert a master piece with a known thickness, i.e. 0.2 mm, in between the tip and the reference surface;
- Read the displayed dimension, i.e. 0.22 mm
- Calculate the Kx coefficient (related to the current transducer: G2..G5) = Master dimension / Red dimension = 0.2 / 0.22 = 0.9091;
- Repeat this procedure for each transducer used

Operator

Identifies the type of link between the various transducers:
‘‘+’’ = The reading of the transducer that follows is added
‘‘-’’ = The reading of the transducer that follows is subtracted
‘‘)’’ = Terminates the formula.

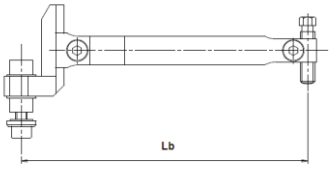
Gain coefficient (finger ratio)

The coefficient Kq determines an equalisation of the quote based on the finger ratio, i.e. the ratio between the distance gauging tip-fulcrum of the head and transducer-fulcrum of the head (see the following picture).



$$Kq = (Lb + 22) / 57$$

where Lb is the finger length.

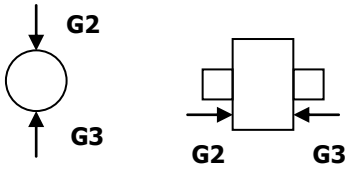


In the following table are displayed the gain coefficient for the standard finger set

Finger ratio	
Finger lenght Lb [mm]	**Kq for Top Gauge 200**
56	1.368
70	1.614
100	2.140
120	2.491

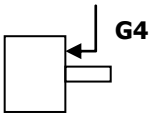
Part program: MEASURE FORMULA (…continue)

Example 1 – Diameter or thickness gauging with G2 and G3 transducer, 70 mm fingers lenght



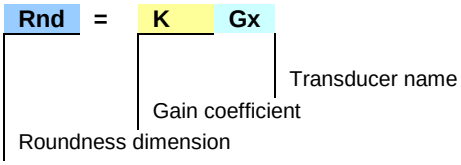
Formula: D = 1.614 (1.0 G2 + 1.0 G3)

Example 2 – Position gauging using the transducer G4 and 56 mm finger lenght



Formula: D = 1.368 (1.0 G4)

Part program: ROUNDNESS FORMULA



The gauging of roundness is defined by setting a formula, of single term, where one of the four transducers is selected (G2, G3, G4, G5). The structure of the formula is as follows:

Rnd = K Gx where x = 2, 3, 4, 5.

the meaning of coefficient K can be summarised: K = Kq Kx (see measure formula).
The role of coefficient K is that of weighing up the reading made by the transducer. The coefficient value is normally supplied in the technical sheet for the gauging head, since it depends on the sensitivity and mechanical construction of the transducer.

The value of this coefficient can be set using the previously described procedure for the measure formula.

Example: Formula for finger Lb = 70mm : **Rnd = 1.614 G2**

Commands in Gx Transducers setup			
6041		F1	TG200 connect Every time that a gauging head, TG200-LG type, is connected with the system already on, it is necessary to execute the command for it to be acknowledged. In case, after the command, the corresponding configuration parameters are not displayed on the screen, it means the gauge head is not correctly connected or is faulty

Commands in Parameter Setup			
0036		F2	Digital interface test