OPERATING INSTRUCTIONS

Electronic position indicators

DD52R-E *(GN 9053)**

DD52R-E-RF *(GN 9153)**

*(Product series valid only for Germany)

elesa®

Contents

1 Safety Instructions

The product has been designed and manufactured in accordance with the current regulations. The product leaves the factory ready for use and complies with the safety standards.
To maintain the product in this state, it is necessary that it is assembled and used properly, in the closest compliance with this instruction manual and with the following specific safety precautions.
Ensure that the user has read and understood the instruction manual and in particular the chapter “Safety Instructions”.
In addition to the instruction manual, all the rules of law must be observed, in regard to accident prevention and environmental protection.
This manual is intended as an indispensable supplement to the existing documentation (catalogues, data sheets and assembly instructions).

The use, without complying with the descriptions / specific parameters, in combination with systems / machines / processes to be controlled, can lead to a malfunction of the product, causing:
- health hazards,
- environmental hazards,
- damage to the product and to its proper functionality.

The device must not be used:
- in explosion hazard areas;
- in medical/life support areas and equipment.

Do not open the equipment and do not tamper with it! Any tampering might have a negative impact on reliability of the device and might be dangerous.
Do not attempt any repair. Return any defective equipment to the manufacturer! Any violation of the integrity of the device as delivered will cause the warranty loss. Changes or modifications not expressly approved by the party responsible for compliance could void the user’s authority to operate the equipment.

Setup / Commissioning

In case of any malfunction (even in case of change in operating conditions), the device must be switched off immediately. Switch off power supply during any installation work at the equipment. Installation and commissioning are allowed by trained and authorised staff only. After correct setup and commissioning, the device is ready for operation.

Maintenance / Repair

Switch off the power supply of the equipment before any action. Maintenance should be performed by trained and authorised staff only.

Do not open or modify the case of the indicator. Tampering with this product may endanger the correctness and accuracy of its operation.

In case of malfunction, do not attempt any repair to the units and contact Elesa sales office.

1.1 Release Informations

Even if almost all the functionalities are the same as in the previous releases, the manual deals with devices with release higher than 5.01.00 (see cap. 8.6.3).

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

2 System description

The electronic position indicators DD52R-E, with battery power supply, can be used on passing through shafts in any position to provide the reading of the absolute or incremental positioning of a machine component.

Mechanical and electrical characteristics	
Power supply	Lithium battery CR2477 3.0 V
Battery life	Up to 5 years (3 years for RF version)
Display	6-digit LCD of 12 mm height and special characters
Reading scale	-199999; 999999
Number of decimal digits	programmable (1)
Unit of measure	mm, inches, degrees programmable (1)
Rotation max. speed	300/600/1000 r.p.m. (2) programmable (1)
Precision	10.000 impulses/revolution
Protection level	IP65 or IP67
Working temperature	0 °C ÷ +50 °C
Storage temperature	-20 °C ÷ +60 °C
Relative humidity	max. 95% a 25 °C without condensation
Environment	indoor use
Altitude	up to 2000 m

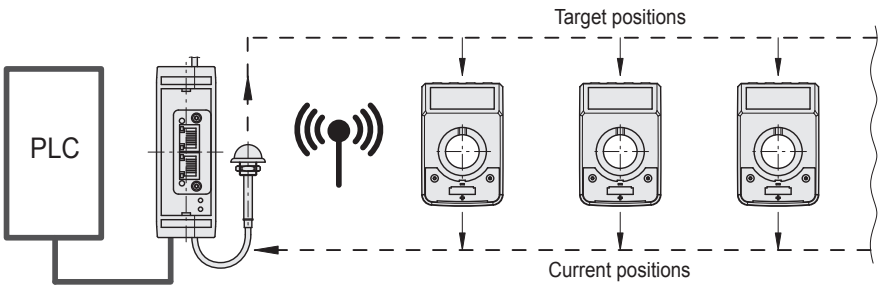
(1) See cap. 8.1
(2) Default: 600 r.p.m.

WARNINGS!

Higher rotation speeds to 600 r.p.m. can be maintained for short periods of time.
The value of the max speed affects the battery life.

2.1 Wireless devices network

The electronic position indicators DD52R-E-RF is compatible with Elesa wireless network which allows electronic position indicators to communicate with a PLC via radio.
Elesa wireless network is made by the following components:
- One control unit UC-RF
- Max 36 device as DD51-E-RF, DD52R-E-RF or MPI-R10-RF



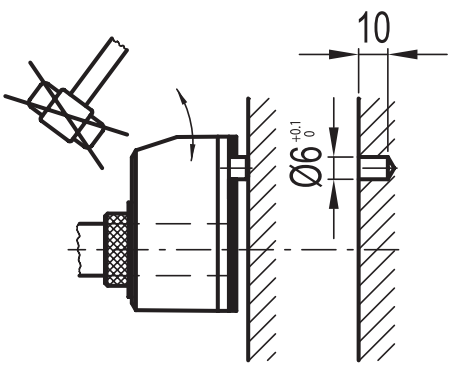
The control unit UC-RF is provided with a standard interface for the most common industrial busses to be connected to the PLC and allows the information transmission between the PLC and the electronic position indicators DD52R-E-RF. The control unit UC-RF exchanges information with the electronic position indicators DD52R-E-RF via radio frequency and allows the setting of the target position and the control of the current position of each indicator, directly from the PLC.

WARNINGS!

Read the control unit UC-RF instructions for more details regarding its configuration.

3 Assembly

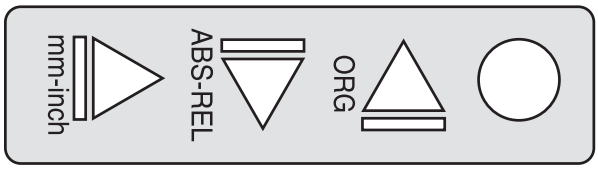
1. Drill a Ø 6x10 mm hole in the body of the machine with a 30 mm centre distance from the shaft to fit the rear referring pin.
2. Fit the indicator onto the spindle and make sure that the referring pin fit the hole.
3. Clamp the boss to the spindle by tightening the grub screw with hexagon socket and cup end, according to UNI 5929-85.



4 Symbols on the display

1. Absolute / relative mode
2. Low battey level
3. Unit of measure (mm / inch / degrees)
4. RF connection
5. Target position indications

5 Key function

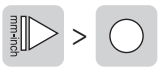


WARNINGS!

The key icons are conventionally shown with the default display rotation set to 180.

Key	Operating mode	Programming mode
○	Press for 3 sec to enter the programming mode.	Parameter selection / Confirm of parameter change
ORG	Programmable with one of the following options (see the _ _ _ 0 _ _ voice of the menu – cap. 8.3): *d_tArG*: when a target is loaded the display shows the actual absolute position. Pressing the key, on the display appears the target absolute position to reach. d_toG0 [DEFAULT]: when a target is loaded the display shows the distance to reach the target position. Pressing the key, on the display appear the actual absolute position. 0FF: the key is not assigned to any function in the operating mode.	Digit increase / Scroll for parameters bottom-top on the menu tree

	Select the: ABS: absolute measuring mode REL: incremental measuring mode It is possible to choose one of the following options (see the _ _ 0 _ _ _ voice of the menu – cap. 8.3): ArCLr [DEFAULT]: switching from ABS to REL the counter is set to zero. Ar: switching from ABS to REL the counter is not set to zero. OFF: the key is not assigned to any function in the operating mode.	Digit decrease / Scroll for parameters top-bottom on the menu tree
	Press the key to select the unit of measure needed. The options available are: millimeters, inches and degrees. It is possible to choose one of the following options (see the 0 _ _ _ _ _ voice of the menu – cap. 8.3): ALL [DEFAULT]: selectable units of measure: mm, inch, D nodEG: selectable units of measure: mm, inch OFF: the key does not allow the unit of measure conversion	Programming mode exit / Digit selection
	Programmable with one of the following options (see the 0 _ _ _ _ 0 voice of the menu – cap. 8.3): P_OrG [DEFAULT]: show and set the OriGin parameter P_StP: show and set the StEP parameter P_OFS: show and set the OFFS parameters OFF: the key combination is not assigned to any function in the operating mode.	N/A
	Programmable with one of the following options (see the _ _ 0 _ _ 0 voice of the menu – cap. 8.3): L_OrG [DEFAULT]: the key combination sets the absolute value to the sum of the parameters Origin and Offset. OFF: the key combination is not assigned to any function in the operating mode.	N/A

	Programmable with one of the following options (see the `___0_0` voice of the menu – cap. 8.3): `tArGEt`: the keys combination allows to load/program one of the 32 target positions. See cap. 8.4 `OFF` [DEFAULT]: the key is not assigned to any function in the operating mode.	N/A
	To turn on the indicator, hold  then press the key  . After the start-up sequence, the indicator will be ready to be used (see cap. 6)	N/A

Note: the words increase, decrease, up and down refers to the direction of the arrow are in the default configuration as shown in the picture. Changing the display orientation, the meanings of the keys are inverted.

6 Turning on the system

After reading and understanding the section “Safety Instructions”, proceed by switching on the indicator.

Turn the indicator on hold  then press the key  .
The display will light up and the indicator will be ready to be used.

6.1 Turning off the system (only for storage)

To turn the system off enter the programming mode, select the `rESEt` parameter then press the key  . At this point, press the button  and then press the key  ; the display will turn off and the indicator will go into sleep mode.

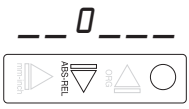
7 Operating mode

7.1 Absolute / incremental measuring mode selection

Press the key ABS-REL to select the absolute or incremental measuring mode.

The measuring mode selected is shown on the display by the symbols:

- *ABS*: absolute measuring mode
- *REL*: incremental measuring mode



It is possible to change the key function by chosing one of the available options in the voice menu __0___

The available options are:

- *ArCLr* (default): passing from *ABS* to *REL* the counter is set to zero.
- *Ar*: passing from *ABS* to *REL* the counter is not set to zero. In this case, the counter is set to zero by pressing ○ + ABS-REL.
- *OFF*: the key ABS-REL is disabled and does not allow changing the selected measuring mode.

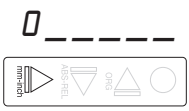
To program the parameters listed above, see cap. 8.

7.2 Measure unit selection

Press the key mm-inch to select the unit of measure needed. The options available are millimeters, inches and degrees.

The measuring mode selected is shown on the display by the symbols:

- *mm*: millimeters - *INCH*: inches - *D*: degrees



It is possible to change the key function by chosing one of the available options in the voice menu 0_____

The available options are:

- *ALL* (default): units of measure that can be selected: mm, inch, degree
- *nodEG*: units of measure that can be selected: mm, inch
- *OFF*: the key is disabled and does not allow changing the selected measuring mode.

To program the parameters listed above, see cap. 8.

7.3 Setting the absolute reference

After having selected the absolute measuring mode and stopped the shaft in the starting position or in the reference position, press the key combination ○ + ABS-REL to set the absolute value to the sum of the values of the parameters *0rG* (absolute reference value) and the selected *0FFS* (compensation value).

The value of compensation (offset) allows you to adjust the value shown on the display in such a way that takes into account, for example the wear or the tool change. The system allows to store up to 10 values of compensation.

By pressing the key combination ○ + ABS-REL, the screen shows the last compensation value used (eg *0FS 0*).

Choose the desired compensation value by pressing the key ABS-REL or ORG, and then press the key ○ to confirm.

The screen will display the absolute value equal to the sum of the values of the parameters *0RG* and *0FFS*.

To program the offset values, see parameter *0FFSET* of cap. 8.

__0__0

It is possible to change the function of the keys combination by chosing one of the available options in the voice menu *__0__0*

The available options are:

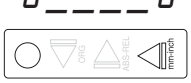
- *L_0rG*: the key combination ○ + ABS-REL allow to choose an offset compensation and set the origin value;
- *0FF*: the keys combination ○ + ABS-REL is not associated to any function in the operating mode.

To program the parameters listed above, see cap. 8.

7.4 Direct programming of the absolute reference value (origin), of the compensation value (offset), of the reading after one revolution (step)

The function of the keys combination ○ **+** mm-inch allows direct access to the programming of one of the following parameters: Origin, Step or Offset.

0____0



It is possible to change the function of the keys combination by chosing one of the available options in the voice menu *0____0*

The available options are:

- *P_OrG*: direct programming of the absolute reference value (OrG parameter)
- *P_StP*: direct programming of the reading after one revolution (StEP parameter)
- *P_OFS*: direct programming of the compensation value (OFFS parameter)
- *OFF*: the keys combination ○ + mm-inch is not linked to any function in the operating mode

For programming the parameters listed above see parameter *O____O* of cap. 8.3.

7.5 Targets

The electronic position indicators DD52R-E allows the set up of 32 target positions to store relevant machine configuration setting.

To program the targets:

- selet *tArGEt* in the main menu (see cap. 8)
- select *PrOG_t* (see cap. 8.4)
- select the memory location (*PtG01* to *PtG32*) by using the keys ABS-REL or ORG
- press the key ○ to select.
- follow the instructions in cap. 8.1 to set the value.

To load a target:

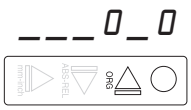
- select *tArGEt* in the main menu (see cap. 8)
- select *LOAd_T* (see cap. 8.4)
- select the target value (*LtG01* to *LtG32*) using the keys ABS-REL or ORG
- press the key ○ to select.
- The value of the selected target is shown.
- Press ○ again to confirm or press mm-inch to go back to the target selection list.

The keys combination ○ + ORG allows direct access to the programming or loading of targets depending on the value assigned to parameter *___O_O* .

If enabled, the key combination allow to chose between the two following operations:

LOAd_t: choose one of the 32 available target positions, then press ○ to confirm.

PrOG_t: choose to program one of the 32 available target positions, then press ○ to start programming.



It is possible to change the function of the keys combination by chosing one of the available options in the voice menu *___0_0*

The available options are:

- *tArGet*: enable the direct load or program targets functions
- *0FF*: the keys combination ○ + ORG △ is not associated to any function in the operating mode.

WARNINGS: When a target is loaded the mesure unit cannot be changed.

7.5.1 Reaching the target position

If a target is selected, the device suggests the shaft rotation direction in order to reach the target position by using the symbols ◀ and ▶.
It is possible to set the tolerance of the target by means of the *P_t0LL* parameter (see cap. 8).
The symbols ◀ and ▶ works depending from the *dir* and *P_t0LL* parameters, as shown below:

	dir –o	**dir o--**
M < T - Toll	◀◀ (blinking)	▶▶ (blinking)
T - Toll ≤ M < T	◀|	|▶
M = T	|	|
T < M ≤ T + Toll	|▶	◀|
M > T + Toll	▶▶ (blinking)	◀◀ (blinking)

T = set target

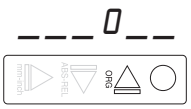
M = measured value

Toll = tolerance (see Ptoll)

If a target is selected it is possible to cancel it by entering the programming mode and by selecting the *StoP_t* option. Alternatively, is possible to cancel it by pressing the keys combination ○ + ORG △ and confirm the *StOP_t* command pressing the key ○. To keep the target selection press the key mm/inch.

7.5.2 Display target mode

Press the key  to show the present or the target position depending on the settings of the device.



It is possible to change the function of the key and the target mode by chosing one of the available options in the voice menu ___0__

The available options are:

- *d_tArG* (default): when a target is loaded, the display shows the actual absolute position and the indication to reach the target, as already explained in cap. 7.5.1. By pressing the key  the set target position is shown.
- *d_to_Go*: when a target is loaded, the display shows the distance to the set target and the indication to reach the target, as already explained in cap. 7.5.1. If the target is not reached, the display blinks. By ressing the key  the display shows the actual absolute position.
- *OFF*: the key  is not associated to any function in the operating mode.

7.5.3 Target tolerance

Set the value of *Ptoll* parameter to define the tolerance allowed for the target (see cap. 8 for details).

7.6 RF version (DD52R-E-RF)

7.6.1 Programming the network parameter (nEt id) and the channel parameter (nEt ch)

The radio network of the system is defined by the following two parameters:

nEt id: id 00/99 (NetID = 03 is reserved and is not possible to be used)

nEt ch: ch 01/36

These parameters can be configured in the radio menu of the indicator (see cap. 8) and they must be set according to the PLC recipe in order to guarantee a perfect communication between the control unit UC-RF and the electronic position indicator DD52R-E-RF.

Warning

For the DD52R-E-RF with firmware release equal to 5.1 or higher, channel 1 is equivalent to channel 4 of the previous version. Consider it in case of use of the old system with UC-RF with fw release lower than 5.1.

7.6.2 Targets

Using the electronic position indicators DD52R-E-RF, target positions can be sent from the PLC to the indicators through the control unit. When a target is set, the behaviour is the same as described in cap. 7.5.

8 Programming mode

Press the key  for 3 seconds to enter the programming mode.
Depending on the setting of *PASS* parameter (see cap. 8.6.4), the system may require to enter by using a password.

Press the key  and  to scroll through the list of parameters and select the required one by pressing  .

Press the key  to exit the programming mode.
The programming mode is automatically dropped after 30 seconds of inactivity.

8.1 Programming parameters with numeric values

Press the key  and  to increase or decrease the flashing digit. Consider the arrow direction because the effect of the key depends on the display direction (see *diSPL* parameter in cap. 8)

Press the key  to select the next digit.

Press the key  to confirm the value and go back to the list of parameters.

The numeric values of the parameters must be inserted taking into account the selected unit of measure.

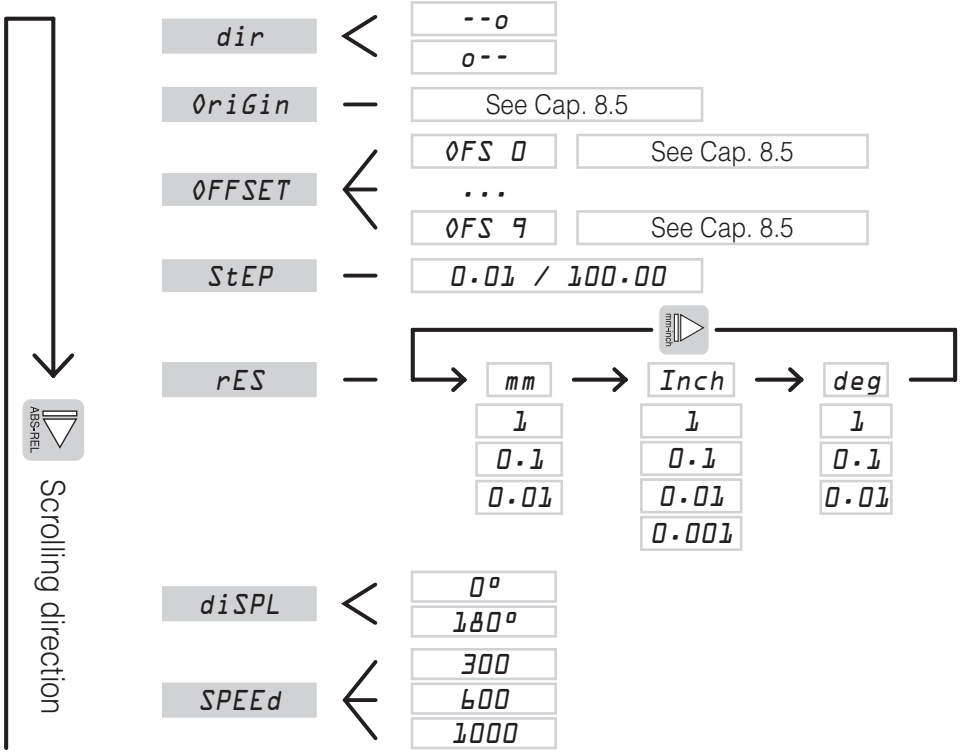
When a parameter is changed from its stored value, by confirming it, the display shows the message *CHAnGd*.
When exiting in the programming mode, the parameters are stored in the internal memory. If a parameter is changed, the display shows the message *StorE*

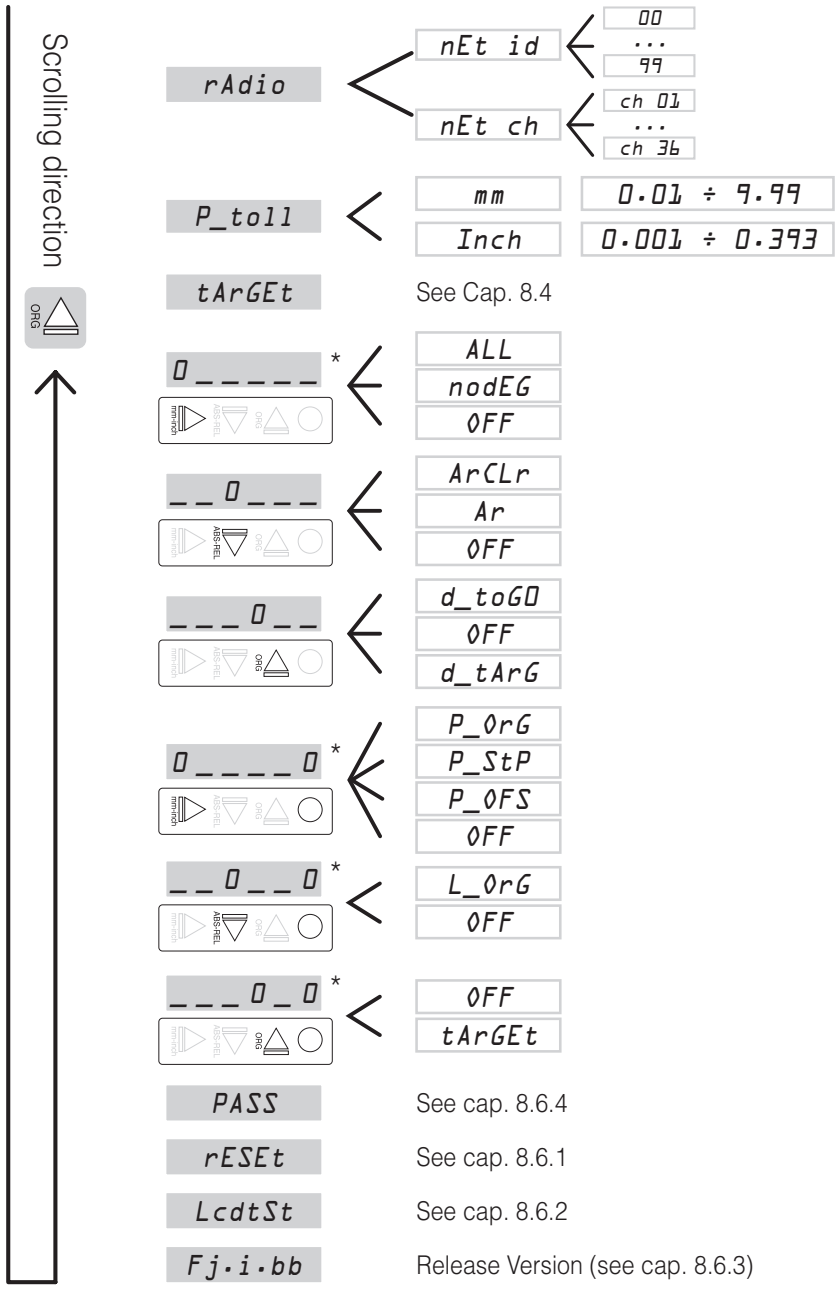
8.2 Device parameters (in alphabetical order)

Parameter	Description	Available options	Default
dir	Measurement direction Set direction of the positive axis	--o counterclockwise rotation to increment the measure o-- clockwise rotation to incrememnt the measure	--o
diSPL	Display orientation	0° 180°	180°
OFFSET	Offset Value	See cap. 8.5 The system allows to store up to 10 compensation values: OFS 0 ... OFS 9	0.0
OriGin	Reference value displayed at the starting point	See cap. 8.5	0.0
P_toll	Tolerance of target position	mm: 0.01 ÷ 9.99 inches: 0.001 ÷ 0.393 degrees: 0.01 ÷ 9.99 The parameter value depends on the unit of measure selected.	mm: 0.10 inches: 0.004 Degree: 0.10
rAdio	Wireless transmission parameters	nEt id: id00 ÷ id99 nEt ch: ch01 ÷ ch36	id 00 ch01
rES	The parameter allows to defin the resolution of the measure	mm: 1; 0.1; 0.01 inches: 1; 0.1; 0.01; 0.001 degrees: 1; 0.1; 0.01	mm: 0.1 inches: 0.01 degrees: 1
SPEEd	The parameter set the maximum speed of the movement in rpm that can be correctly read	300; 600; 1000	600
StEP	Reading after one revolution	0.01; 100.00	001.00

Parameter	Description	Available options	Default
_ _ _ 0 _ _ “ t_Sho”	Display visualization during target mode	d_toGO: during the positioning, the display shows the distance from the target. Keep the key ORG pressed, on the display will appear the actual position of the indicator. d_tArG: during the positioning, the display shows the actual position, keep the key ORG pressed, on the display will appear the target position to reach.	d_toGO
tArGEt	Target options	See cap. 8.5	0.0

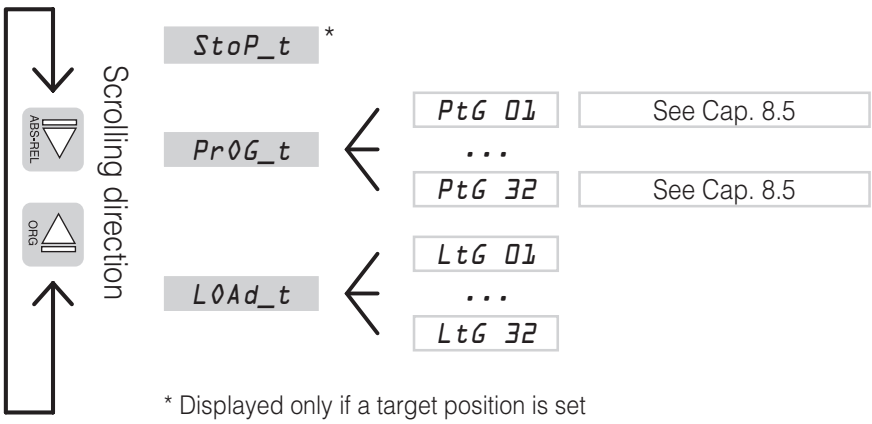
8.3 Main menu tree





* See key definition 7

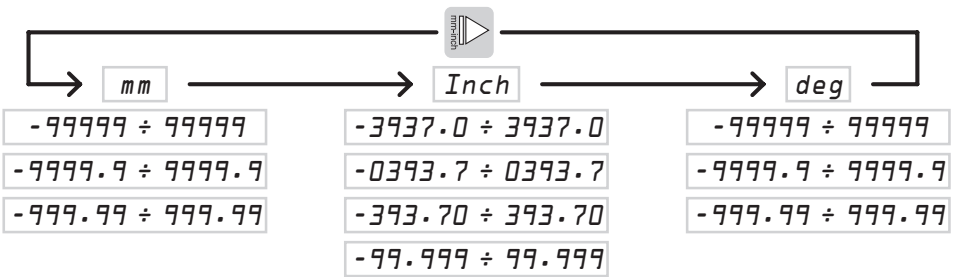
8.4 Target menù tree



* Displayed only if a target position is set

8.5 Parameter value

The parameter value depends on the unit of measure and resolution set.



The value may change according to the resolutions of mm and inch.
Es.
If rES mm = 1 and rES inch = 0.01
The max parameter in mm is -25399 ÷ 25399 because if we convert the value in inch 25399 / 25.4 = 999.96 which is the max value visible on the display with the res inch = 0.01
In case the parameter is 25400 it is not possible to show the converted value because 25400 / 25.4 = 1000.00

8.6 Additional features

8.6.1 Reset

To reset the device to the factory setup:

- select the voice rESEt from the main menu (see cap. 8.3)
- change the value from no to YES by pressing the key ORG
- press the key ○ to confirm

8.6.2 Test LCD

The *LcdtSt* voice in the main menu allows to switch on all the display segments and symbols.

8.6.3 Release version

It is the last voice of the main menu.
The release number is shown with the "*r*" first letter.

By pressing the key  other information aree shown, which have to be comunicated to Elesa staff in case the support needed.

8.6.4 Password

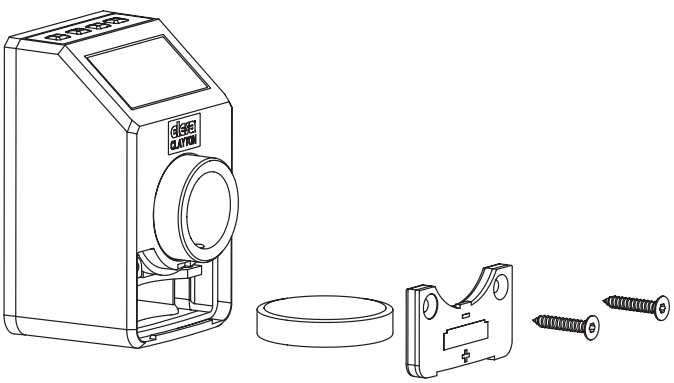
It is possible to avoid free access to the device menu by choosing "*on*" in the *PASS* voice of the menu.
In this case to enter the menu the password 22011 (see cap. 8.1) must be inserted.

9 Battery replacement

The internal lithium CR2477 - 3.0 V battery ensures up to 8 years battery life (3 years for RF version).

The symbol  appears on the display when the battery replacement is required.

The replacement is made by simply unscrewing the two TORX T6 screws and by removing the front cover, with no need of disassembly the indicator from the control shaft consequently all the configuration parameters are kept unchanged.



For removing the battery from the battery compartment, we recommend the use of a magnet. By replacing the battery in less than 5 seconds, all the measurement and settings are not lost. If more time is required and the display turns off, the settings of the device have to be made or verified again.

10 Problem solving

Message on the display	Description	Action
– – – – – –	Exceeding the reading scale (-199999; 999999). The value cannot be shown on the display.	The system continues to measure displacements; the value is shown on the display again if re-included in the reading scale.
S_Err	The shaft speed has exceeded the max system speed (see table on cap. 8).	Press ○ to go back to the value reading and re-set the absolute reference.
 Flashing battery symbol	Low Battery	Replace the battery (see cap. 9).

EU DECLARATION OF CONFORMITY (DOC)

WE

COMPANY NAME:	Elesa S.p.a.
POSTAL ADDRESS:	Via Pompei 29
POSTCODE AND CITY:	20900 Monza
TELEPHONE NUMBER:	+39 039 28111
E-MAIL ADDRESS:	info@elesa.com

Declare that the DoC is issued under our sole responsibility and belongs to the following product:

PRODUCT:	Electronic Position Indicators
APPARATUS MODEL:	DD52R-E
TRADE MARK:	Elesa

The object of the Declaration described above is in conformity with the relevant Union Harmonization Legislation:

2014/30/UE (EMC): Electromagnetic Compatibility Directive

2011/65/UE (RoHS): Restriction of the use of certain Hazardous Substances in electrical and electronic equipment

The following harmonized standards and technical specifications have been applied:

EN 61326-1:2013

Notified Body:

Not Involved (Annex II - Conformity Assessment Module A)

Additional information:

Software Version: 5.1 or higher

PLACE, DATE OF ISSUE:	Monza – Italy	CARLO BERTANI
	18/05/2020	MANAGING DIRECTOR
		GENERAL MANAGER

EU DECLARATION OF CONFORMITY (DOC)

WE

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Declare that the DoC is issued under our sole responsibility and belongs to the following product:

PRODUCT:	Electronic Position Indicators
APPARATUS MODEL:	DD52R-E-RF
TRADE MARK:	Elesa

The object of the Declaration described above is in conformity with the relevant Union Harmonization Legislation:

2014/53/UE (RED): Radio Equipment Directive

2011/65/UE (RoHS): Restriction of the use of certain Hazardous Substances in electrical and electronic equipment

The following harmonized standards and technical specifications have been applied:

- EN 61326-1:2013
- EN 61010-1:2010
- ETSI EN 301 489-1 V2.1.1
- ETSI EN 301 489-1 V2.2.3
- ETSI EN 301 489-17 V3.2.2
- Draft ETSI EN 301 489-17 V3.2.2
- EN 61326-1:2013
- ETSI EN 300 328 V2.2.2

Notified Body:

Not Involved (Annex II - Conformity Assessment Module A)

Additional information:

Software Version: 5.1 or higher

PLACE, DATE OF ISSUE: Monza – Italy 18/05/2020

CARLO BERTANI
MANAGING DIRECTOR
GENERAL MANAGER

Elesa S.p.A., Monza, January 2021

The texts and examples have been written with great care. Nonetheless, mistakes can always happen. The Company Elesa S.p.A. can neither be held legally responsible nor liable for lacking or incorrect information and the ensuing consequences. The Company Elesa S.p.A. reserves the right to alter or improve the electronic position indicators or parts of them and/or the enclosed brochures without prior notice.

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