

# OPERATING INSTRUCTIONS



## ***DISAG RM IV***

Ring and target measuring machine



14th edition of Operating Instructions dated 21 Oct. 2015  
Software from Version 1.20.0 onwards

These operating instructions presuppose knowledge of the evaluation of targets.  
Although it has been compiled and written with the greatest of care and proof-read,  
mistakes and errors cannot be ruled out.

DISAG RM IV  
10.08.2005/E8

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## 1. General

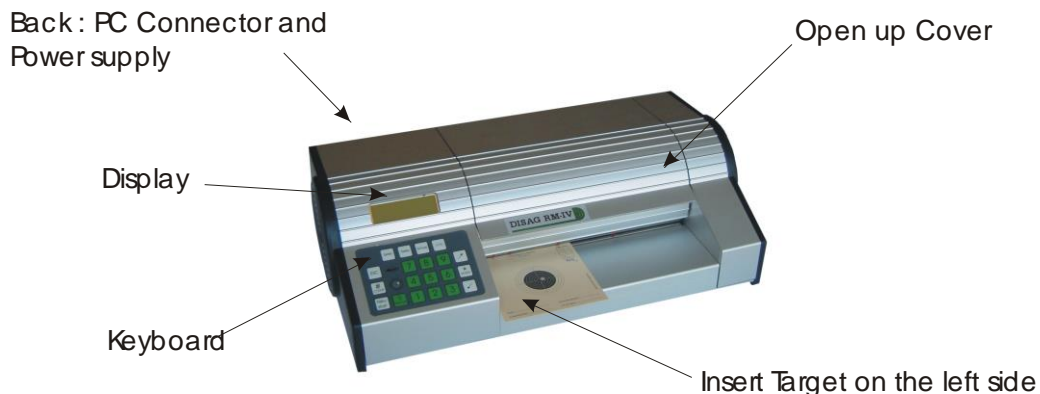
The **DISAG RM IV** ring and score measuring machine is a fully automatic target evaluation unit for all the usual air rifle, air pistol, small bore, gallery rifle and running target targets and bands up to 225 mm in width.

The following are used as abbreviations:

AR – air rifle  
AP – air pistol  
SB – small bore  
GR – gallery rifle  
RT – running targets  
S1 to S5 – special targets 1 to 5

Maximum 2 shots per target can be evaluated in the case of air rifle targets. Maximum 5 hits per target can be evaluated as far as air pistol, small bore, gallery rifle and the special targets S1 to S5 are concerned. Shown in the case of running target cards are one shot per target. Should several shots hit the target then these scores are marked by the suffix "\*" as symbol.

The machine is operated by means of a display and keyboard. Connection to an evaluating computer is possible through RS 232 and USB interfaces. The scores can be printed directly on the target by means of the built-in printer.



**Figure 1: DISAG RM IV overview**

We would ask you to please read these operating instructions before putting the machine into **commission for the first time**. If you want to refer to some aspects when using the machine later please use the **keyword register** at the end of these instructions.

Your DISAG/KE Team wishes you every success and enjoyment in your competitions.

## 2. Safety instructions

- 5 **Disconnect the plug from the mains before opening the housing!** Make sure that the mains plug is disconnected before cleaning, servicing and maintenance.
- 6 **Always clean the DISAG RM IV with extreme care!** The camera sensor is only to be cleaned with a spectacle cleaning cloth or a cotton wool stick. Never clean inside the unit with a moist cloth.
- 7 **Do not disconnect the mains plug from the plugbox by pulling on the cable!**
- 8 **Do not put the DISAG RM IV in operation if the mains cable is damaged or the machine housing shows any visible signs of damage.**
- 9 **Repairs to electrical equipment are only to be made by qualified electricians!** Unprofessional work can endanger life!
- 10 **Read these operating instructions carefully before you put the machine into operation!** Damage or claims under guarantee for customer service as a result of non-observance of these instructions are excluded under our guarantee!
- 11 **Look at the rating plate!** Make sure that the given mains voltage and frequency conform with the main voltage and frequency of the power supply on location. Please also refer to the rating plate on the back of the unit for the required fuse rating.

### General instructions

- 5 As far as possible only use targets with ample contrast (black). Badly printed targets can lead to errors in evaluation.
- 6 Make sure that target paper is adequate in quality. Targets stored in damp conditions can crease when being evaluated or lead to badly defined shot holes which, in turn, can lead to evaluation errors. Stacks of targets should be stored flat in a dry place. Badly cut air rifle target bands (faults in production by the target manufacturers) can lead to evaluation errors.
- 7 Please make sure that the bands are not creased or damaged in any other way when being used.
- 8 When evaluating target bands the band must not be raised to the front or back when running through the machine.  
The band must hang freely to the front and be able to run out horizontally on the table at the back.
- 9 Special care must be taken when evaluating single targets. Wait for the printout before removing the evaluated target and inserting a new target. This could otherwise cause paper blockages.
- 10 Avoid changes from cold to warm in the ambient temperature (the camera lenses can be fogged up).
- 11 No liability can be taken for possible damage when the machine is used for any other purpose than for which it was built or operating errors!
- 12 Avoid vibration during transportation or when setting up the evaluation machine. The **DISAG RM IV** is a calibrated measuring instrument and will only give good results when treated with the greatest of care.
- 13 Please note that the targets have to be evaluated in the direction in which they are inserted in the machine.

### 3. Technical data

	<b>DISAG RM IV</b>
Size (L x W x H)	420 x 225 x 135 mm
Weight	6.5 kg
Max. target width	225 mm
Display	2 x 16 characters
Power supply	100-240 V, 50-60 Hz
Current input	1.88 A

Space for your notes:

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## 4. Getting started

### Requirements on site:

Place the **DISAG RM IV** on a horizontal surface. Make sure that there is sufficient free space to the front and back of the machine to ensure that the targets for evaluation are transported flat through the machine. The targets must not be prevented from running straight through the evaluation machine.

The ambient temperature and the air humidity must be moderate. Temperatures under 5° C and over 40° C should be avoided both in operation and when storing the **DISAG RM IV**.

### Connection to mains power supply:

Connect up the evaluation machine to the mains power supply with the supplied cable. Please observe the details (voltage, mains frequency) given on the rating plate.

The version number will be displayed for a brief period after switching on the **DISAG RM IV**. You should always have the version number ready to hand should you have any enquiries about the unit.

```
DISAG RM IV
V1.00.7 15.07.02
```

### Setting one type of target



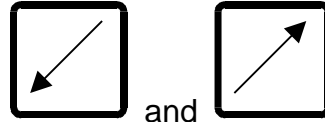
The required type of target to be evaluated next can be selected with the **NEU-START**- key. Several standard types of targets have already been defined before putting the machine into **operation for the first time**. Should you need to use further types of targets these can be entered in a learn-in process at any time.

The following will be shown on the **DISAG RM IV** display:

```
Type123456789ABX
1 AR-Target
```

Twelve different types of target can be filed in the machine. The filed data is also retained even after the machine has been switched off. Every capital X stands for a not occupied memory slot. An used memory slot is displayed with '1' – '9' and 'A', 'B' and 'C'.

A triangle flashes on the first type (the "1"). The flashing triangle is the actual entry position. Afterwards the triangle is designated with the "cursor".



The cursor can be moved with the ARROW KEYS and . Any memory slot from '1' to '9' and 'A' to 'C' can be selected as needed.

**Important:** Standard targets and bands are entered at the factory in a learn-in process. If you use other targets at the club these must be entered in the machine as new targets.

Type 1	AG 10 target band
Type 2	AP target 17 x 17 cm
Type 3	AG single target
Type 4	SB 50 m 20 x 20 cm
Type 5	Running target
Type 6	Gallery rifle 12 x 12 cm

Type 7	AP cut 13.5 x 13.5 cm
Type 8	SB cut 13.5 x 13.5 cm
Type 9	AG 10 target band wide
Type A	Not used
Type B	Not used
Type C	Not used

**Tip :** Before learning of a special target, please check that the target parameters are programmed correctly ( like described on page 23 ).  
 The target parameters are necessary for a correct programming of special targets.

**Example for entering one type of target in learn-in procedure:**

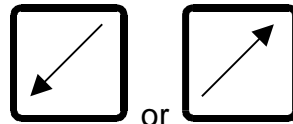
A 10-m air rifle target band is to be entered in memory slot 7. Go to the first X with the arrow key.



Press the ENTER key. The following appears on the display:

```
Type123456XXXXXX
Not defined
```

The type of target (air rifle, air pistol, small bore, gallery rifle, running target and S1 to S5



) can be selected by means of the ARROW KEYS or .

In our example we now confirm the "AR-Target" with the ENTER key. The following appears on the display:

```
No. of targets
10 ?
```

The question mark flashes to draw your attention to the fact that an entry can be made. Should you not be in agreement with 10 targets per band and the air rifle target has only one target, for example, the flashing cursor can be set behind the question mark with the

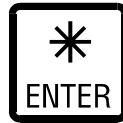


CLEAR-key. Now, for example, 1 can be entered with the NUMERAL KEYS. The



entry is confirmed with the ENTER-key.

If we want to set 10 targets per band we immediately confirm the question as to the



number of targets by means of the ENTER-key.

The following is displayed :

```
Insert new  
Target type.
```

### To insert the target :

An unused target or target band must now be inserted in the evaluation shaft of the machine so that it runs up against the left side. A target stop to the right is to be used for better alignment of the target more especially in the case of target bands.



**Figure 2: Inserting the target**

**Note!**

When setting the target stop to the paper width, make sure that the respective target or target band is guided without any play but on the other hand it must not stick.  
 A target stop which is set too tight can lead to the target becoming distorted, which, in turn, can falsify the evaluation results.

The transport rollers will start to run and the target will be drawn into the machine as soon as the target has been recognised by a light barrier on the left side of the evaluation shaft.

**Important!**

The target must not be pulled or pushed by hand or moved in any other way once it has been taken up by the machine.  
 The **DISAG RM IV** is a measuring instrument and as such should be treated with care!

The following will be shown in the display:

Measureing 1  
 Target.

The **DISAG RM IV** determines the position of the targets one after the other which means 10 times in the case of an air rifle band and once for single targets.

As soon as this operation has been concluded the following will appear in the display:

Type1234567XXXXX  
 10 AR-Targets

Now, as a result of this, the new type of target and its number will be placed in the X position. The cursor will flash above this type of target. Now the seventh type of target has been set.

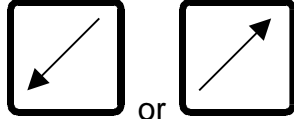


If the ENTER-key is now pressed, the evaluation unit will be set to the new type of target.

Afterwards the actual set number of shots for the selected type of target will be displayed.



This can be taken over by pressing the ENTER-key if the setting is correct. Should another number of shots be required, a different number of shots can be selected



with the ARROW KEYS or .

This means that already defined types of target will be recognised automatically again even after the **DISAG RM IV** has been switched off. A once programmed type of target will be recognised **from the paper width** when the target is pushed into the evaluation shaft. Always push the target in the position which has been entered in the learn-in process when evaluating.

**Attention : Starting with the software version V 1.05.4, you can switch off the automatic target-type-detection. If you wish the manual target-selection, you can select this in the menu 'Typechange'**

**To delete one type of target:**

If you should want to delete one type of target, select the type by means of the ARROW KEYS in the NEW START menu and then press the CLEAR key.

A question will then come up on the screen and you will be asked whether you really want to delete this type of target. Confirm this with the ENTER key. The process can be interrupted with the ESC key without this particular type of target being deleted.

The setting sequences for a new type of target should be obvious from the program operating sequences. However, the **DISAG RM IV** program offers considerably more facilities. The functions of the different keys are covered in the next chapter in these operating instructions.

## 5. The key functions

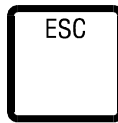


Figure 3: The keyboard

The **DISAG RAM IV** evaluation machine is operated by means of a membrane keyboard with 20 keys.

Once the machine has been set with this keyboard there is no need to press any other key to evaluate the target. Even a once filed type of target will be automatically recognised **from the paper width** of the target. Should several targets with the same paper width have been entered then it will be necessary to pre-select the required type.

## 5.1 ESC key



The ESC key serves to break off an entry. It is also possible to break off an ongoing process by means of this key "selection of type of target", for example. The transport rollers are to be switched off again by means of this key should they have been started using the ARROW KEYS.

Menus are left with the ESC key after the system has been set by means of the 1/10 ring or DFC keys.

## 5.2 SERIES key



The SERIES key enables the actual series of scores to be displayed and the evaluation of the series to be selected. If one series has already been set then the actual results of the series will be displayed.

```
Series:  5 of 10  
Tot.    46 Rings
```

If the SERIES key is pressed once again the required evaluation of the series can be selected by means of the ARROW KEYS:

- No series
- 10-shot series
- 20-shot series
- 30-shot series
- 40-shot series
- 60-shot series
- Special series.

Should "no series" have been set at the beginning, then direct access is given to the selection menu. The special series key enables you to enter your own series.

Selection of the required series is confirmed by means of the ENTER key. This setting is **not** retained when the unit is switched off. To store a set series permanently → see "machine configuration".

A not completely shot series can be deleted with the CLEAR key after pressing the SERIES key.

**Example of a target evaluation:**

A **20-shot air pistol series** each with 5 shots per target is to be evaluated.

The air pistol must be selected through the NEW START key, provided that it has already been measured and stored in the memory. Afterwards the number of shots per target is set to 5 shots per air pistol target. The 20-shot series is to be selected by means of the SERIES key and confirmed with the ENTER key.

Set the target stop to the width of the target.

Push the first target in the evaluation shaft to ride up against the left-hand side until it is taken up by the transport rollers.

Let us assume that the first target has been hit 5 times. The following appears on the display:

```
Target type 3
Air Pistols
```

and afterwards, for example:

```
Series: 5 of 10
5 hits 45 R
```

After the next target has been also evaluated, the following appears on the display:

```
Series: 5 of 10
5 hits 49 R
```

Displayed is always the result of the last respective evaluated target (or target band). The actual total scores of the running series can be displayed at any time by pressing the SERIES key.

```
Series: 5 of 10
Tot. 94 Rings
```

Return is by means of the ESC key. Should no further key be pressed, the display will automatically jump back after a few seconds.

Should the signal tone be activated (see "machine configuration") the end of the series will be signalled by 2 short bleeps. Should more than 20 shots have been shot only those shots up to the complete series will be evaluated for the last target.



If a series is to be broken off, this is possible when the total scores are displayed (see above). This series can then be broken off by means of the CLEAR key, which means to say that both the total score and the number of hits in the series will be set to 0.

The shots are evaluated in the given sequence from front to back and from left to right in direction in which the target is inserted. This evaluation sequence is generally valid as far as the **DISAG RM IV** is concerned.

The scores for each target will be printed on the target in the given evaluation sequence as soon as the printer is switched on. The 10-shot interim scores are marked with "Z" on the printout. Moreover, the final scores are printed on the last target in a series and marked with "Σ" (total). The various scores are marked with "\*" in the case of multiple hits. In this case the given evaluator (competition judge) must be asked to check the target to confirm the correctness of the scores.

Sometimes it can be, that there is no score evaluation possible ( for example no shot on the target, too many shots on a AR-target or a too short broken AR-band ). Then the user will be asked to enter the missing results by hand, so that a series will be complete. The manual results are marked with the '#'-sign.

```
Target   :   7  
0.* R
```

If a target is inserted again after the completion of a series, the evaluation of the series starts from the beginning again. The previously completed series is to be deleted with the CLEAR key to be certain that in actual fact a new series is being commenced. Missing shots in the case of a **not completed** series will otherwise only lead to a wrong score in the following series.

The type of target cannot be changed once a series has been started. If a wrong type of target has been inserted then the target will be rejected and run out of the machine backwards and the following fault message will appear on the display:

```
No change of  
Types in series
```

### 5.3 DFC key ( Distance From Center )



The DFC menu is accessed with the DFC key. By pressing the ENTER key the DFC display is switched on and off by means of the CLEAR key. Afterwards the actual maximum DFC for the active type of target will be displayed. The actual setting can be taken over with the ENTER key. Should another setting be required the new maximum DFC must now be entered and confirmed with the ENTER key. The maximum DC is the limit value for the display (printout) of the DFC values. Only DFCs up to this maximum DFC are displayed (printed). DFCs that are larger are not evaluated.

This setting can be left by means of the ESC key. The entered settings will then be deleted when the machine is switched off. Please read the instructions under "machine configuration" to file the settings permanently.

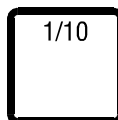
### 5.4 SHOT key



The number of shots per target for the actual type of target can be altered by means of the SHOT key. The next possible number of shots will be jumped to every time by repeatedly pressing the SHOT key. The number of shots can also be altered through the ARROW KEYS. The actual selected number of shots is to be confirmed and taken over with the ENTER key.

The given setting can be left by means of the ESC key. The entered settings are deleted after the machine has been switched off. Please read the instructions under "machine configuration" to file these settings permanently.

### 5.5 1/10 key



Whether the ten rings are to be evaluated or not is set by means of the 1/10 key. The ENTER key means YES, the CLEAR key means NO.

The cursor blinks on the active setting.

Subsequent setting of the ten rings for the ten DFC. Here again the ENTER key means YES and the CLEAR key stands for NO.

The setting can be left by means of the ESC key. The entered settings will be deleted after the machine is switched off. Please read the instructions under "machine configuration" to file the settings permanently.

## 5.6 ENTER key



The ENTER key serves to confirm an entry in all menus for possible selection. In the display <\*> corresponds with the ENTER key.

## 5.7 CLEAR key



The CLEAR key serves to delete an entry or display in all menus or reject a possible selection. In the display <#> corresponds with the CLEAR key.

Once a target has been evaluated another ring value can be entered by hand by means of the CLEAR key after pressing an ARROW KEY. Ring values entered by hand are marked with "#" as symbol.

Moreover, an incomplete series can be deleted by means of the CLEAR key when the series is shown in the display.

## 5.8 NEW START key



Evaluation can be started again with the NEW START key or a new type of target can be entered by means of the learn-in procedure. Should the NEW START key be pressed during a running series then a fault message will be displayed (see SERIES key).

The function of the NEW START key has already been explained in the chapter on "commissioning".

## 5.9 MENU key



The standard settings can be altered in the menu which can be called up with this key. This key can only be used if readiness is indicated in the display. You can move to the readiness message at any time by pressing the ESC key (possibly several times).

### Important!

Alterations made to the standard settings in the machine configuration are also retained after the **DISAG RM IV** is switched off.  
Unprofessional altered standard values can influence the measurement results provided by evaluation machine.  
Repair or service costs incurred as a result of faulty operation are not covered by the guarantee.

The following is shown on the display:

```
Start with <*>  
Configuration →
```

Now a choice of different menus is given through the ARROW KEYS.

"Configuration", "Typechange", "Target Values", "PC-Protocol", "Language", "Licence" and "Service menu".

The point indicated in the menu can be called up by means of the ENTER key.

Let us start with the "configuration" menu. Scrolling backwards and forwards is possible with the ARROW KEYS. As described below we are scrolling forwards (ARROW key from bottom left to top right).

### CONFIGURATION

These call-ups follow one after the other:

#### Ring tenths (basic setting: no)

It is possible to set whether evaluation is to follow with or without the ten rings. Operation is appropriate to the 1/10 key but with the difference that the set values in this case are not lost when the **DISAG RM IV** is switched off. The ENTER key means "Yes", the CLEAR key means "No".

#### DFC tenths (base setting: no)

The same also applies accordingly for setting the DistanceFromCenter-Value.

**Printer (basic setting: yes)**

In this way it is possible to select whether the printer is to be turned on or not each time the machine is switched on.

**Signal tone (basic setting: yes)**

Attention is also drawn to faulty functions or operating errors acoustically if the signal tone is switched on (1 bleep). The end of a series is indicated by 2 beeps.

**Small bore 100-shot evaluation (basic setting: no)**

The 100-shot evaluation is used for small bore shooting (mainly in Switzerland). If small bore 100-shot evaluation is switched on, the DFCs will no longer be shown on small bore targets but just the 100-shot assessment. The abbreviation for the 100-shot assessment is "H".

**Show DFC (basic setting: yes)**

This and the following values can be entered, like described in the DFC-key description. The values will be stored in a nonvolatile memory, so that the setting will be present at every new start of the machine.

**Max. air rifle DFC (basic setting: 250)****Max. air pistol DFC (basic setting: 250)****Max. small bore DFC (basic setting: 250)****Max. gallery rifle DFC (basic setting: 250)****Max. running target DFC (basic setting: 250)****Max. S1 DFC (basic setting: 250)****Max. S2 DFC (basic setting: 250)****Max. S3 DFC (basic setting: 250)****Max. S4 DFC (basic setting: 250)****Max. S5 DFC (basic setting: 250)**

Only DFC values are shown which are lower or equivalent to this value (see also DFC key).

**Air pistol DFC factor (basic setting: 26)**

Here the DFC division factor can be set for air pistol evaluation. The air pistol DFC is calculated from the range in 1/100 mm provided by the DFC factor. The required value is to be entered, multiplied by 10 since no decimal point positions can be given. Example: the factor 3.6 is to be entered ⇒ enter 36.

This DFC division factor is to enable air pistol shooters to be assessed on equal terms with air rifle shooters in a mixed competition.

**Series (basic setting: 0)**

In this way it is possible to set the series to be valid as standard series. Any required number can be entered by means of the NUMERICAL KEYS after the CLEAR key has been pressed.

Any entry deviating from the standard series (see SERIES key) will be recognised as a special series. Entering the number 0 means "none".

This entry is to be confirmed with the ENTER key.

Important: the series cannot be appropriated to any specific type of target but is valid as the general basic setting for all assessments.

**Air rifle, number of shots (basic setting: 1, possible values 1 and 2)**

**Air pistol, number of shots (basic setting: 1, possible values 1 to 5)**

**Small bore, number of shots (basic setting: 1, possible values 1 to 5)**

**Gallery rifle, number of shots (basic setting: 1, possible values 1 to 5)**

**Running target, number of shots (basic setting: 1, possible values only 1)**

**S1 number of shots (basic setting: 1, possible values 1 to 5)**

**S2 number of shots (basic setting: 1, possible values 1 to 5)**

**S3 number of shots (basic setting: 1, possible values 1 to 5)**

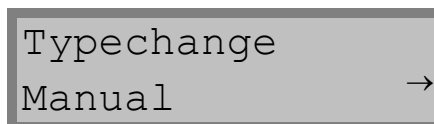
**S4 number of shots (basic setting: 1, possible values 1 to 5)**

**S5 number of shots (basic setting: 1, possible values 1 to 5)**

To be set is the number of hits to be evaluated per target.

The ESC key is to be used to turn back again. Now we scroll to the "target values" with the ARROW key from bottom left to top right.

## Typechange

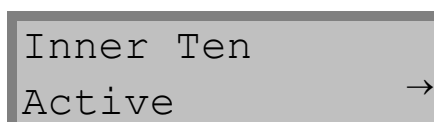


Here you can select the behavior of the DISAG RM IV for the typechange. You can select 'manual' or 'automatic'.

At the manual typechange the user must select the required type by himself. With the automatic typechange the DISAG RM IV changes automatically to the best matching type ( which must be learned before ). The new type is selected by the paper width of the type who fits best.

**Important : If you have types with the same paper width ( for example cutted AP and SB-targets ), it is not possible for the evaluation machine to recognise the correct type when inserting the target. So it could happen that the machine does not select the correct type. Here you must select the new type manually ! Also it can be possible, that there are problems with targets, when the paper width is different anyhow it is the same target-type. Then it is better to select the manual typechange in the menu, so that an unintended typechange can not happen.**

## Inner Ten



Here you can select the behaviour of the DISAG RM IV for the inner ten. You can select 'active' or 'not active'. If you select 'active' an inner ten result will be marked with a small circle on the printout.

## Target Values

```
Target values
Air rifle      →
```

The target values can be set for air rifle, air pistol, small bore, gallery rifle, running target and the special targets S1 to S5.

### Important!

The set target values should only be changed by a person authorised to do this within the club. These settings effect the target scores.  
As standard the target data is to be set according to the ISSF Regulations and the Sport Ordinance of the German Shooters Association.

A code number is integrated in the program to prevent any changes being made to the pre-set target values by persons who have not read these operating instructions. This is necessary for standard targets for air rifle, air pistol, small bore, gallery rifle and running target guns. The special targets are not safeguarded by means of a code. The code number becomes valid after the "target value" menu has been selected with the ENTER key. Since the number ■■■■\* followed by the ENTER key is entered by means of the NUMERICAL KEYS, access is given to the "target value" menu. In principle, this menu is also structured in tree-form like the configuration menu. The type of target is selected by means of the ARROW keys. Access is given to the target data with the ENTER key. The target data can be altered by means of the CLEAR key, NUMERICAL keys and ENTER key.

The values are to be entered in 1/100 millimetres. This means to say that entering 15440 means 154.40 mm, for example.

Scrolling backwards and forwards is possible with the ARROW keys when an arrow can be seen to the top right in the display.

**\*Note:** The code number for changing target values is not provided in these operating instructions. This meets the stipulations of the ISSF (which means to say prevents any manipulations). This code number is available to authorised specialist dealers should it be necessary to change target values.

### Example: Definition of a special target S1 as small bore 100 m target

After the "special target 1" menu has been selected with the ENTER key the target diameter is called for.

```
Target diam.  →
21000 ?
```

This can be confirmed if the diameter of the first ring (or in this case with the cut bull's-eye as example) is 210.00 mm. Another entry can be made as indicated in the previous menu point by means of the CLEAR key, NUMERICAL KEYS and ENTER key. Since no decimal point can be entered just the figures are entered in their given sequence.

The respective target data can be measured with a millimetre gauge but this data can also to be found in the "Sport Ordinance" of the German Shooters Association (see target data).

Continue scrolling with the ARROW TO THE RIGHT KEY. The diameter of bull's-eye is called for:

```
Bulls eye diam. →  
20000 ?
```

The 200.00 mm is to be confirmed, if this is the diameter of the bull's-eye. Another entry can be made as indicated in the previous menu point by means of the CLEAR key, NUMERICAL KEYS and ENTER key. Since no decimal point can be entered just the figures are to be entered in their given sequence.

Continue scrolling with the ARROW TO THE RIGHT KEY. The following appears in the display:

```
Ring 10 diam. →  
5000 ?
```

This can be also confirmed if the ten ring is 50.00 mm in diameter. As you are well aware another entry can be made by means of the CLEAR key, NUMERICAL KEYS and ENTER key.

Continue scrolling with the ARROW TO THE RIGHT KEY. The following appears in the display:

```
Ring width 9 →  
2500 ?
```

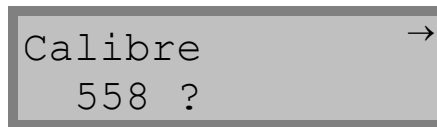
and

```
Ring width 1-8 →  
2500 ?
```

The width of the ring is the distance between the two rings (only 1 to 9). This entry is also to be confirmed with the ENTER key. Another entry can be made as indicated in the previous menu point by means of the CLEAR key, NUMERICAL KEYS and ENTER key. Since no decimal point can be entered just the figures are to be entered in their given sequence.

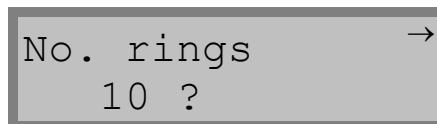
Continue scrolling with the ARROW TO THE RIGHT KEY. The following appears in the display:





The calibre must be entered. Another entry can be made as indicated in the previous menu point by means of the CLEAR key, NUMERICAL KEYS and ENTER key. Since no decimal point can be entered just the figures are to be entered in their given sequence.

Continue scrolling with the ARROW TO THE RIGHT KEY. The following appears in the display:



Here the number of rings is to be entered. In the case of the small bore 100 m target in our example there are 10 rings. Another entry can be made as indicated in the previous menu point by means of the CLEAR key, NUMERICAL KEYS and ENTER key  
 We leave the "special target 1" menu by pressing the ESC key. Changes to the target data or other types of targets can be made In the same way after selecting with the ARROW keys.

**Target data**

The data is laid down for the different targets in compliance with the regulations of the International Shooting Sport Federation and the Sport Ordinance of the German Shooters Association.

The following target data below is provided, based on the regulations valid in 2001 but no guarantee is given for these figures.

<b>Air rifle, range 10 m</b>		<b>Air pistol, range 10 m</b>	
Format	10 x 10 mm	Format	17 x 17 mm
10-ring		10-ring	
Total diameter	45.5 mm	Total diameter	155.5 mm
Bull's-eye dia.	30.5 mm	Bull's-eye dia.	59.5 mm
Ring 10 dia.	0.5 mm	Ring 10 dia.	11.5 mm
Width of rings 1-9	each 2.5 mm	Width of rings 1-9	each 8.0 mm
<b>Small bore rifle, range 50 m</b>		<b>Gallery rifle, range 15 m</b>	
Format	17 x 17 mm	Format	12 x 12 mm
10-ring		10-ring	
Total diameter	154.4 mm	Total diameter	85.5 mm
Bull's-eye dia.	112.4mm	Bull's-eye dia.	40.5 mm
Ring 10 dia.	10.4 mm	Ring 10 dia.	4.5 mm
Width of rings 1-9	each 8.0 mm	Width of rings 1-9	each 4.5 mm

<b>Air rifle, running target, range 10 m, for 2 m aisle</b>	
Format	26 x 15 mm
10-ring	
Total diameter	50.5 mm
Bull's-eye dia.	30.5 mm
Ring 10 dia.	5.5 mm
Width of rings 1-9	each 2.5 mm

No guarantee is given for the accuracy of all figures!

**Please refer to the Sport Ordinance of the German Association of Shooters for further target data.**

### PC-Protocol

The **DISAG RM IV** offers a selection of different PC-protocols ( starting with software version V 1.05.1 ). Supported is the transmission protocol of the SAM 4000 an the DISAG Windows RM III-protocol in fast an slow speed mode. Here you must select your preferred pc-protocol, which must also be supported by your PC-software. When the DISAG Windows RM III-protocol is activated, then the additional menuline 'Remote access' is visible.

### REMOTE ACCESS

Only when the DISAG Windows RM III protocol is activated, this menuline is visible. When the remote access is activated, the **DISAG RM IV** can only be accessed by the PC. There are no more selections possible on the evaluation machine. All keys except the MENUE-key have no functions. The MENUE-key is only valid, so that you can switch off the remote access. When the remote access is activated, then the following message appears on the display :

```
Remote access  
Waiting for PC..
```

When you work with the PC-software ARIS, then you can definie the complete settings for the evaluation on the PC ( for example : target type, series ... ). The PC transmits the complete setting to the **DISAG RM IV**. Now you can start inserting the targets because all settings are defined and no more user action must be taken on the machine. For more information please refere to the PC-software dokumentation.

### LANGUAGE SELECTION

**DISAG RM IV** provides operator guidance in various languages. The required language can be selected under this menu. This point in the menu has been safeguarded by the Code Number 7942 to prevent accidental changeover (after which you perhaps will no longer be able to follow the instructions).

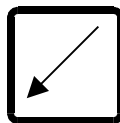
## LICENCE NUMBER

The licence number (which is the same as the serial number of the machine) will be shown when this point in the menu is called up. This licence number must be known to update software. You will receive further information when an update is made.

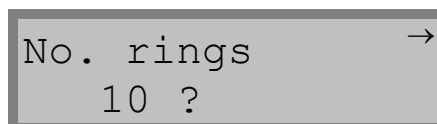
## SERVICE MENU

Since machine specific variables can be altered in the service menu which can cause faulty functions if not carried out professionally this section of the program is also blocked by means of code to prevent use.

### 5.10 ARROW KEY FROM TOP RIGHT TO BOTTOM LEFT



The ARROW key (from top right to bottom left) enables scrolling backwards in those sections of the program in which an arrow is shown in the display.



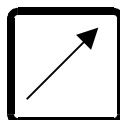
Moreover, this enables the drive motor of the drawing-in mechanism to be run backwards so that any target that may be stuck in the evaluation shaft can be run out of the machine again. The motor is switched off again by means of the ESC key.

### Important!

The target must not be pulled or pushed by hand once it has been taken up by the machine.

The **DISAG RM IV** is a measuring instrument and should be also treated as such!

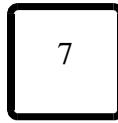
### 5.11 ARROW KEY FROM BOTTOM LEFT TO TOP RIGHT



The ARROW KEY (from bottom left to top right) makes continuous scrolling possible in those sections of the program in which an arrow is shown in the display (see also Fig. 7).

Moreover, this enables the drive motor of the drawing-in mechanism to be run backwards so that any target that may be stuck in the evaluation shaft can be run out of the machine again. The motor is switched off again by means of the ESC key.

**5.12 Key 7 : Printer enable/disable**



With the key '7', the internal printer can be switch on and off. In the configuration-menue it can be defined, if the printer is on or off after power on. With the key '7' the printer can be switch off for some targets and then switch on again.

Important : The configuration will not be changed by pressing the key '7'.

**6. PC connection**



**Fig. 4: PC connection**

The **DISAG RM IV** has a RS232 connection on the back of the machine. An evaluation computer can be connected up via these interfaces.

Should you require further information on data protocols you can get details in Internet under [www.disag.de](http://www.disag.de) or [www.knestel.de](http://www.knestel.de).

**RS232 Interface cable appropriation:**

<b>DISAG RM IV</b>	<b>Evaluation computer</b>	
9-pole D-sub	9-pole D-Sub	25-pole D-Sub
2	3	2
3	2	3
5	5	7

## 7. Irregularity checklist

<b>Irregularity</b>	<b>Possible causes</b>	<b>Remedy</b>
Dirty lenses	<ol style="list-style-type: none"> <li>1. Condensation in machine (cold ⇔ warm)</li> <li>2. Camera sensor lens dirty</li> </ol>	<ol style="list-style-type: none"> <li>1. Wait. Always store and operate the machine at same temperature</li> <li>2. Use compressed air to clean shaft Proceed in accordance with "9. Cleaning"</li> </ol>
Sticking band	One corner of respective target or band is dog-eared or the paper is pinched to some extent. You may find staples tacked to the target.	Travel target/band out of evaluation shaft with ARROW KEY (from top right to bottom left). Straighten end of target/band and insert again
Weak or no printout	<ol style="list-style-type: none"> <li>1. Printer has not been turned on</li> <li>2. Used up ink ribbon</li> </ol>	<ol style="list-style-type: none"> <li>1. Start printer</li> <li>2. Consult specialist (see last page in this chapter)</li> </ol>
Display, off	No mains voltage	Check cable, check fuse on premises
Inaccurate evaluation by machine	<ol style="list-style-type: none"> <li>1. Lens is dirty</li> <li>2. Type of target is similar but not quite the same as has been entered by learn-in procedure (for example, target of another manufacturer)</li> <li>3. Poor target material, twisted target or bad shot holes</li> <li>4. Band stopped during assessment</li> </ol>	<ol style="list-style-type: none"> <li>1. Proceed in accordance with "9. Cleaning"</li> <li>2. Learn-in new type of target</li> <li>3. Have machine calibrated by specialist dealer</li> <li>4. Please observe instructions in chapter 1 on target material and storage</li> <li>5. Observe instructions for handling targets during evaluation!</li> </ol>
Target not accepted. "Type not correct" appears on display	Type of target unknown to machine	Teach-in type of target
Final result of the series not correct	Series status evaluation not set to zero when starting	Before beginning series set series counter to zero with CLEAR key
Completely false evaluations by machine	Various types of target with same paper width	Pre-select type of target by means of NEW START key
Error-Message 'CHECK CAMERA'	The camera-sensor is not in the correct position.	Move down the camera sensor.
Error-Message 'INVALID TARGET'	The inserted target does not match with the actual type. For example a AP target is evaluated as a SB target.	Insert the correct target type or select a new Target type.

## 8. Cleaning

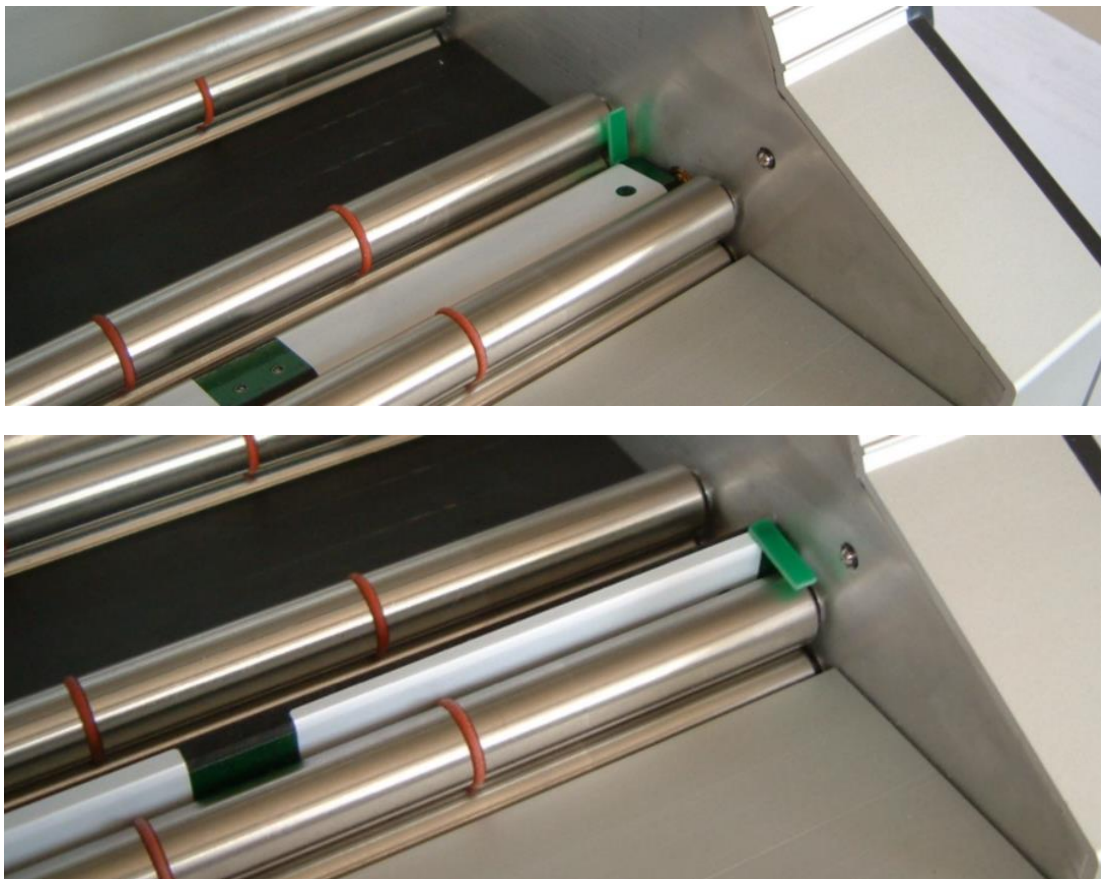
Extreme care must be taken when cleaning the **DISAG RM IV** ring and DFC measuring machine because it is a precision calibrated measuring instrument. As a general rule it will be sufficient to clean the machine from time to time with compressed air. The middle cover can be hinged back for cleaning. Pressurised air spray cans are available from specialist photographic equipment dealers.

**There is no need to open up the housing to any further extent!**

### Important!

Disconnect the mains plug without fail when the housing of the machine has to be opened for servicing and cleaning. Work on the inside of the machine is only to be carried out by trained, skilled personnel of dealers or the manufacturer.  
**Unprofessional work can endanger life!**

The camera sensor can be hinged back to the top for cleaning. The small lever on the right is used to do this. The lens can be cleaned easily with the sensor in upright position.



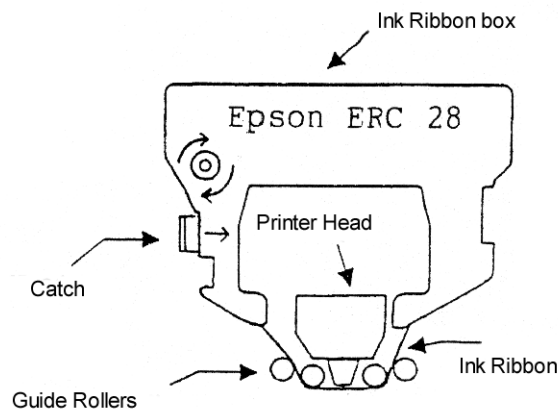
**Fig. 5: Opening up the camera sensor**

## 9. Changing the ink ribbon

Below you will find brief instructions to change the ink ribbon.

1. Disconnect the mains plugs before opening the machine.
2. Make sure that the ink ribbon is threaded between the guide rollers. Press the catch to the side on the ink ribbon cassette in the direction of the arrow and carefully remove the ink ribbon from transport motor.
3. Pull a piece of the new ink ribbon out of the cassette and, as before, thread the ink ribbon between the guide rollers. Attach the ink ribbon to the guide shaft of the transport motor until the catch engages.

Below is a small drawing covering Point 2, to clearly show how the ink ribbon is to be threaded correctly between the guide rollers.



## 10. Maintenance and repair

Maintenance and repair work is only to be carried out by authorised dealer or manufacturer specialists. Non-observance of this makes any claims under guarantee null and void.

## 11. Guarantee

Under their general terms of business *DISAG International/Messrs. KE Knestel Elektronik GmbH* guarantee to repair or replace possible faulty parts free of charge during the guarantee period. This is subject to the product being returned to *KE* directly or through an authorised specialist dealer.

This guarantee is only given when the product concerned is operated in accordance with the operating instructions.

Not covered by the guarantee is damage which can be traced back to improper modifications or damage to the product caused by gross negligence.

### Important!

In particular, this concerns damage components on the circuit board which can be caused by ESD, which means to say electrostatic discharge through personnel to electrostatic hazard.

The product guarantee by *DISAG/KE* is only given when the application for guarantee is accompanied by an original sales slip on which the purchase date and serial number of the product are shown.

## 12. Exclusion of guarantee

Any guarantee presupposes the use of our products for the purpose for which they were built and observance of the servicing and maintenance instructions and the operating instructions including subsequently provided information for operation and servicing the machine.

Excluded under guarantee are all parts of the machine subject to wear as a result of their function.

## 13. Service

Please get in touch with your specialist dealer to service and repair the machine. As such he has the necessary documentation to be able to repair or service the **DISAG RM IV** professionally.

Repairs after elapse of the guarantee period are subject to payment.



**Manufacturer:**



**KE Knestel Elektronik GmbH**  
Osterwalder Str. 12  
D-87496 Hopferbach

**Sales :**



**DISAG GmbH & Co KG**  
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D-96103 Hallstadt

Tel. +49 951 / 65046  
Fax +49 951 / 65049  
E-Mail: [info@disag.de](mailto:info@disag.de)  
Internet: <http://www.disag.de>

**Address of specialist dealer:**

Stamp of your specialist dealer:

**Space for your notes:**

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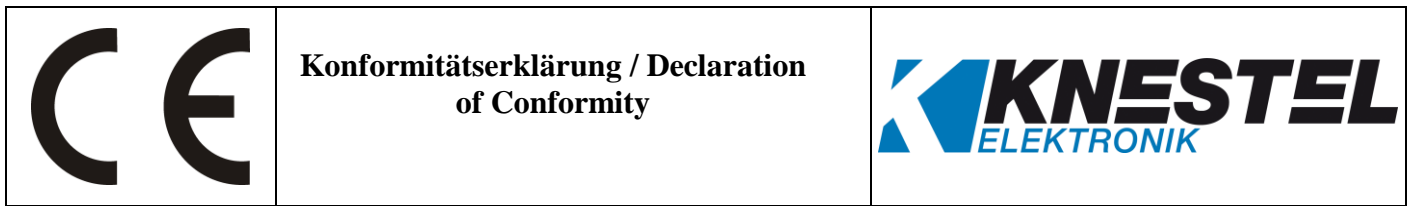
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**KE Knestel Elektronik GmbH**

erklärt hiermit als Hersteller in alleiniger Verantwortung, dass nachstehend bezeichnetes Produkt in Konzeption und Bauart den grundlegenden Sicherheits- und Gesundheitsanforderungen der hier genannten EG-Richtlinien entspricht. Bei Änderungen am Produkt, die nicht mit oben genannter Firma abgestimmt und genehmigt wurden, verliert diese Erklärung ihre Gültigkeit.

herewith declares as a manufacturer its sole responsibility to ensure that the product named hereafter meets the safety and health regulations both in design and construction required by the EC Guidelines stated below.

This declaration becomes void if any change is made to the product that was not discussed and approved by named company beforehand.

**Typ / Model**

DISAG RM IV

**Bezeichnung / Designation**

Ring- und Teiler Messmaschine

Ring and splitter measuring machine

**EG-Richtlinien / EC Guidelines**

- |               |               |
|---------------|---------------|
| • 2004/108/EG | • 2004/108/EC |
| • 2006/95/EG  | • 2006/95/EC  |
| • 2011/65/EU  | • 2011/65/EC  |

**EN-Normen / EN Standards**

- EN 61000-6-1:2007
- EN 61000-6-3:2011
- EN 60950-1:2014
- EN 50581:2013

Bevollmächtigter für die Zusammenstellung der technischen Unterlagen /  
Person Authorised to Compile the Technical File.

Hans Hartig

Hopferbach, 2015-10-21

Geschäftsführer / Managing Director

Anton Knestel



