NOTES OF OPERATION OF THE TOOL
FM20
FM20BLU

Indice generale

FM20

Introduction

The devices FM20 is used on circular looms for the control of quality of the produced cloth and quality related functions.

It is specialized for applications on machines that require two optical head with an easy of use approach.

It exceeds the performance of previous FM10 adding keys and light indications useful when using two optical heads.

QUALITY:

- Check of fabric quality using one or two infrared optic scanners
- Each optic scanner check a length of 60mm or 80mm, for up to 160mm each turn
- Separated section for Holes and for broken meshes
- Stop for reached limit of holes, large holes and broken meshes
- Memorize data about fault founds
- programmable stop delay to place the fault in a preferred position

The device is composed of:

- Main unit (controller) with keyboard, display and light bars for the signal from optic scanner.

- One or two optic scanner /optic heads for the fabric check, in different shapes so to cover from 60mm to 160mm of produced fabric per turn/loop

- Couple Magnet - magnetic Sensor to notice the turns of the loom.

In other words this is improve the already know device FM10BLU

Some technical characteristics
- Power supply voltage 24VAC.
- Power consumption 4W.
- Service Output 2A 250V.
- A secret code can protect set up and data .
- Work on loom speeds from 10 to 70 turns per minute.
- Languages Italian, English, Francaise.

Main unit

The messages on the display change according to the state of operation and the selected page.
Message shown after power-on , without pressing any key, is called 'initial page' and it looks like the following example:
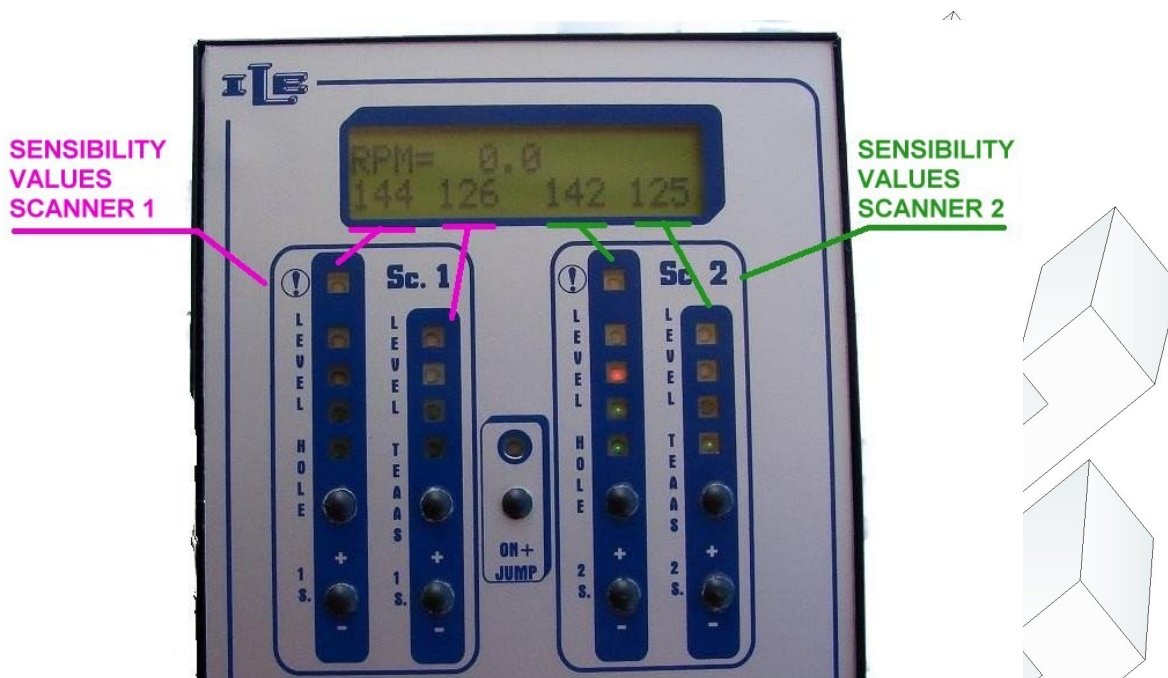
Other information are exposed in the following detailed description of the pages.

The principal functions of the keys are the followings:

·   Key ⊟ 'A' 'Page' , at the left , is used to show the next page on display .

·   Key 'C' '←' used to enter data on as described later.

·   Key '+' used to enter data on as described later.

·   Key 'F' 'Reset' restore the instrument to normal state after a stop, or clear data or other functions as described later.

·   Key 'JUMP' used to enable the jump of the discarded needle, shown by the yellow light . Keep pressed for 3 seconds to enable or disable this option.

·   The Couples of key '+' and '-' put on the right are used to adjust the sensibility of the related light bar , one for Holes sensibility and one for Broken Meshes sensibility , for each optic scanner.

Other on Initial Page and Optic Scanner functions

As mentioned above , the message shown after power-on , without pressing any key, is called 'initial page' .

As mentioned before the instrument check fabric faults using one or two optic scanners and show on related light bar the signal received from the scanner ; two light bars for each scanner, whereas the left bar show signal for holes and the right bar show signal for the broken meshes.

When signal reach red lights the machine is stopped with appropriate messages on the display. Stop can be delayed or conditioned from settings in appropriate sections.

When the machine is stopped the cause is explained from message and lights:

- the error of reaching the planned number of small holes cause the flash of first three leds at left of the tool (2 greens and a red)

- the error of presence of a big hole cause the lighting of all the five leds on the left (2 greens and 3 red)

- the error of 'tears' or dropped stitches cause the lighting of all 4 leds on the right (2 greens and 2 red)

- error of sensibility too high for broken meshes/tears through lighting of all 4 the leds of left.

Once that the error has been detected and the machine stopped, the employee can remove it and reset the tool through the pressure of the key 'Reset '. Then he can proceed to the restart the machine.

There is also the JUMP key (press continuously for 3 seconds) to enable or disable the jump of the discarded needle.

When the jump is enabled the yellow light is on and this immediately implicates the skip of the control of the zones where the discarded needle is detected . If the yellow light is out then the whole fabric is checked.

It is important that the Jump is enabled only if the discarded needle really exist on the fabric.

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Detailed instructions

The device is endowed with various pages that allow to plan all the necessary parameters for a correct operation.

The various pages are flowed in sequence using the special key 'A' -'Page' first to the left having the sketch of the pages; it is possible to return to the initial page by the Reset key or flowing all the pages . Usually the 'C'-'←' moves the cursor and the 'D'-'+' key changes the digit or option pointed.

Here following the description of the various pages, where the pages can be recognized from the page number on the superior line at the left of the display. Note that this description refers to the simplest situation or without 'foreman password', described subsequently.

Page	Description
Initial one	Here there are shown the information more used. This page is already described in detail in the chapter 'initial page of the central unity.' Pressing the key 'Page' he passes to the following page.
01 OPTICAL HEAD	It allows to plan the number of holes of small dimensions to count before stopping the machine. Choice happens through the keys '+ and '← '.
02 HOLES AMOUNT	It visualizes the total number of holes that have caused the stop of the machine. Such number accumulates that due to the survey of holes of big dimensions with that due to the attainment of the quantity of holes of small dimensions planned into the preceding page. The number can be reset by the 'Reset ' key.
03 STOP FOR TINY HOLES	It visualizes the total number of machine stop for little holes . The number can be reset by the 'Reset ' key.
04 LADDERS AMOUNT	It visualizes the total number of machine stop due to broken meshes/ ladders / broken needles. The number can be reset by the 'Reset ' key.
05 STOP DELAY SC.1	In the case of machine stop due to scanner 1signaled fault it delays the stop of the machine in percentage on the duration of the last noticed turn. Enter the percentage with '←' and '+' keys.
06 STOP DELAY SC.2	As mentioned above but for the scanner 2
07 NEEDLE JUMP LENGHT	In this page it is possible to specify the duration of the jump of discarded needle that effects after detecting the discarded needle . During such jump the control of the fabric is suspended, so that possible lacks of needles foreseen in the fabric doesn't cause a block. The value 9 are the maximum duration while 1 is the minimum duration .
08 NEEDLE STOPS	It allows to select if during the stop due to ladders/broken meshes the output relay is always active or intermittent. This can help to recognize the stop .

Page	*Description*
09 TURN OFF BY 'R' KEY? YES/NO	It allow to disable the instrument turn-off , that otherwise can be obtained by press of the 'R' key . Setting 'No' then the 'R' key can only reset the instrument after a stop of the knitting machine. Setting 'YES' then the 'R' key reset the instrument after a stop of the knitting machine, and if pressed for at least 5 seconds it turn-off or disarm the instrument. To return to the normal operation is enough to maintain pressed the 'R' button for other 5 seconds.
10 LANGUAGE ENGLISH/ITALIANO..	Select the language , actually available English , Italian , French, Turkish, Spanish, Portuguese. Other languages can be included.

Important note :
Some version of the instrument does not show all of the pages above described, because some functions and related pages are substituted and integrated in the versions sequence.

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Foreman Password

The password serves to protect the access to the set-up pages of the tool.
If the password is enabled then the initial page is always on top while to visualize the other pages the password is required.

To specify and to enable the password, act as it follows:

1. While the tool is turned on and display the initial page, unplug the connector of the optic head and insert the key of password furnished with the tool.

2. Then is displayed the page for insertion of new password. The key '+' increase the number pointed by the blinking cursor . The key '←' move the blinking cursor to next digit. Password can be any number except '000' . Pressing the 'A' 'page' Key the password is memorized and enabled .

When the password is enabled , pressing the key 'page' cause the password request .

To insert the password use the keys described above. Pressing the 'A' 'Page' key the instrument proceeds to the following pages if the password is correct.

When the password is trained, there are one additional page :

Pagina	Descrizione
LOCK KEYS +,-,J WITH PASS. ?	In the initial page the keys + and - and 'J' allow to regulate the sensibility of the optical head for holes and tears. If it is wanted that such keys are protected with password, to specify 'Yes' in this page. In such case the initial page serves only to read such values .

To disable the password, act as it follows:

1. While the tool is turned on and display the initial page, unplug the connector of the optic head and insert the key of password furnished with the tool.

2. Then is displayed the page for insertion of new password. The key '+' increase the number pointed by the blinking cursor . The key '←' move the blinking cursor to next digit. Use keys to set the number '000' . Pressing the 'A' 'page' Key the password is disabled .

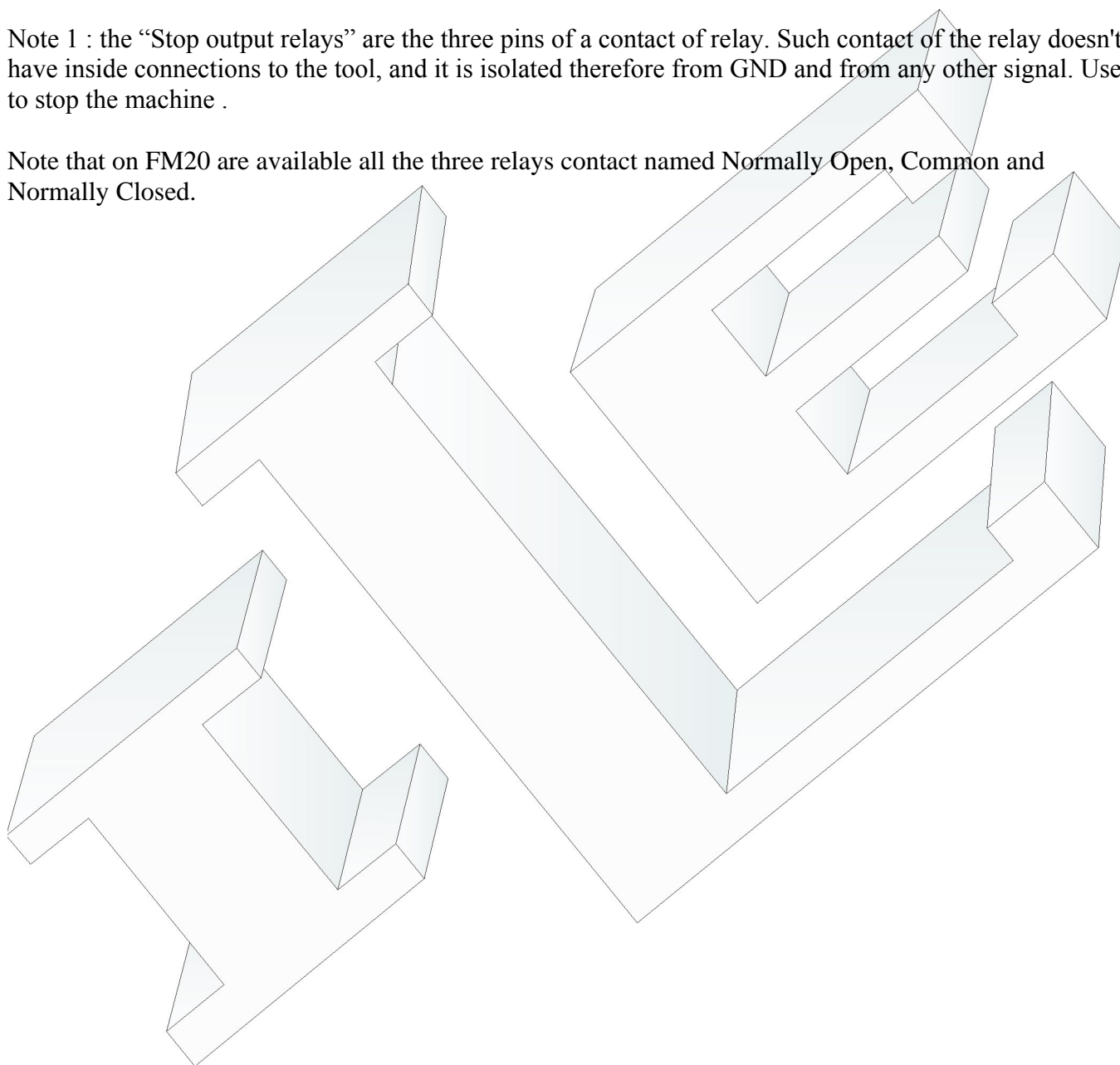In fact the password is enabled only if different from '000.'
The device is furnished with password of default planned to '000, such password it allows the unconditional access to all the pages.

Instruction for installation

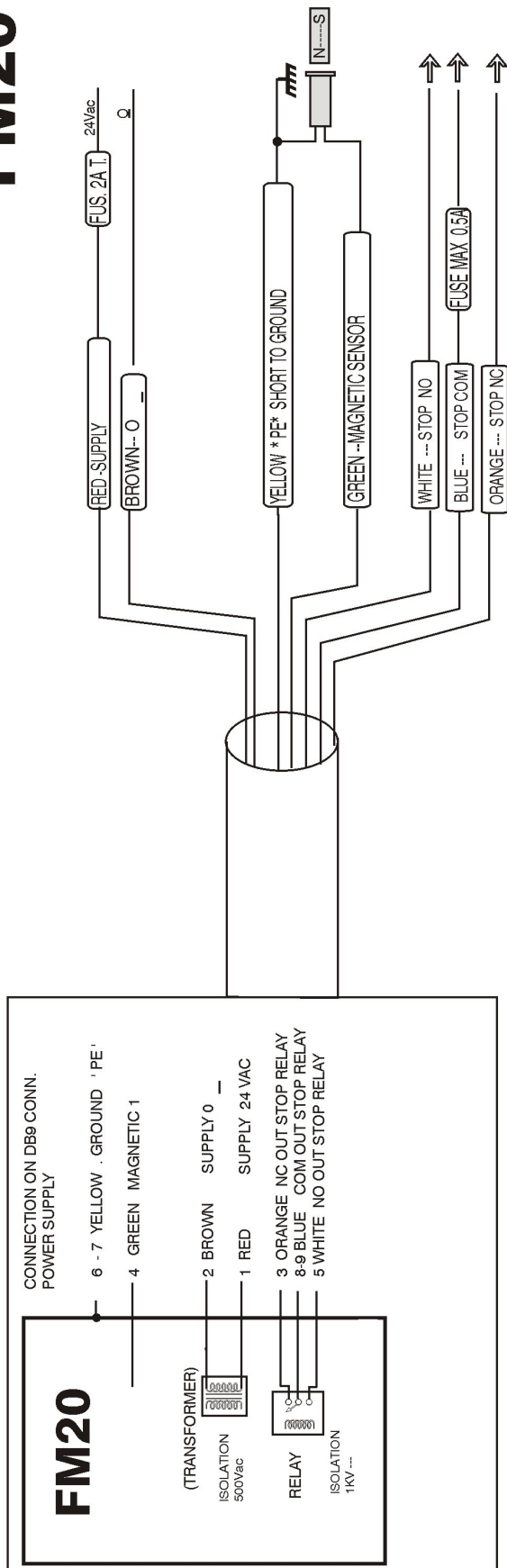Follow the scheme of the connections on the following page.

Note 1 : the "Stop output relays" are the three pins of a contact of relay. Such contact of the relay doesn't have inside connections to the tool, and it is isolated therefore from GND and from any other signal. Use to stop the machine .
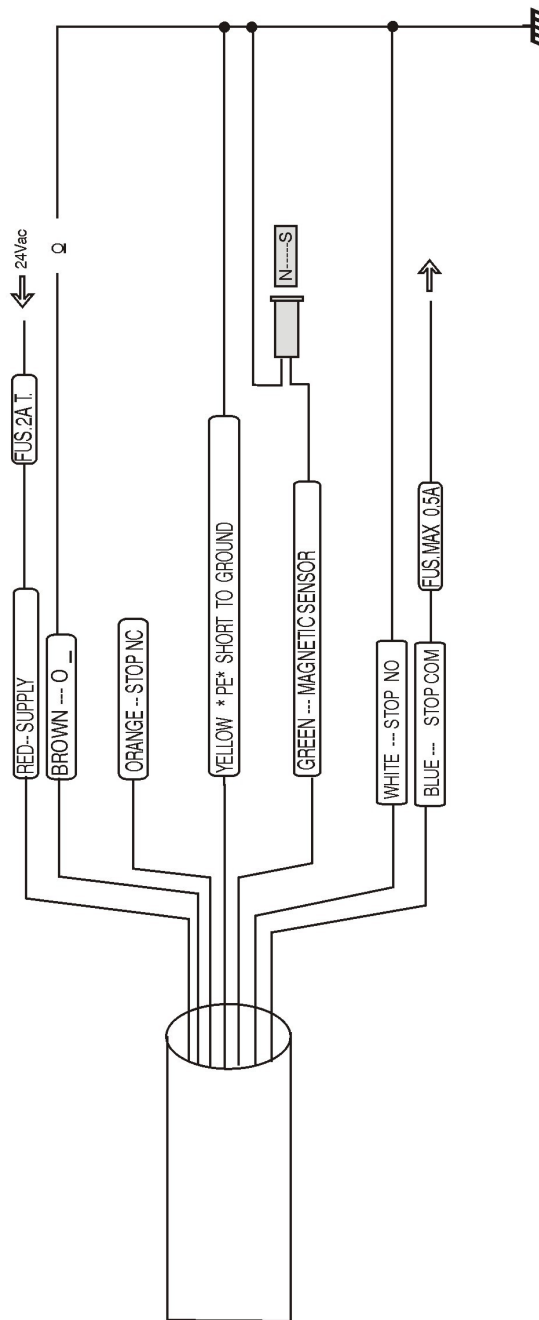
Note that on FM20 are available all the three relays contact named Normally Open, Common and Normally Closed.

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FUS. 2 A T.   24Vac
Ω

RED -SUPPLY

BROWN-- O __

N----S

YELLOW * PE* SHORT TO GROUND

GREEN --MAGNETIC SENSOR

WHITE --- STOP NO

BLUE --- STOP COM   FUSE MAX 0.5A

ORANGE --- STOP NC

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CONNECTION ON DB9 CONN.
POWER SUPPLY

6 - 7 YELLOW . GROUND ' PE'

4 GREEN MAGNETIC 1

(TRANSFORMER)

2 BROWN   SUPPLY 0 __

1 RED   SUPPLY 24 VAC

3 ORANGE NC OUT STOP RELAY
8-9 BLUE   COM OUT STOP RELAY
5 WHITE NO OUT STOP RELAY

ISOLATION
500Vac

RELAY

ISOLATION
1KV ---

SUGGESTED CONNECTION FOR OLD MACHINES
(NOT COMPLIANT WITH NEW STANDARD)

24Vac
Ω

FUS. 2 A T.

N----S

RED - SUPPLY

BROWN --- O __

ORANGE -- STOP NC

YELLOW * PE* SHORT TO GROUND

GREEN --- MAGNETIC SENSOR

WHITE --- STOP NO

BLUE --- STOP COM   FUS.MAX 0.5A

Instructions for the assemblage of the optic head

1. The optic head has a black plastic front with a transparent window, as visible in the following image, and a plastic cork on the back. Mount one or two sleighs of metal on the optic head so that sticks out of around two millimeters from the front. Then mount the optic head with the sleighs in contact with the fabric, so that the front of the head is firmly two millimeters apart from the cloth.

2. The head must be placed on top, next to the needles, where the fabric is formed. It is generally fixed on the yarn guide. The transparent window of the front , visible in the following image, has to be parallel to the defects of the fabric as the dropped stitches. Mainly the head is placed standing in portrait (not landscape), exactly as in the image.

3. If the head is very near to the needles, only the lower sleigh is necessary.

4. Check that the fans don't make to tremble the cloth at their passage. This could cause some stop not necessary.

5. Connect the optical head to the proper main unit connector. If using only one optical head it have to be plugged into 'scanner 1' connector .

6. At this point it is advisable to install the magnetic sensor as described in the following pages , and then set up the sensitivity of the instrument.

7. the sensibility to dropped stitches (shown on display at the right) can be held high careless that machine stop due to noise or other fake defects ; in fact the defect have to be detected on three consecutive turns in the same place in order to stop the machine.

8. The sensitivity to holes (shown on display at left) have to be kept relatively low such to stop only when a big defect is found.

Instructions for assembly of magnetic sensor

1. Install the sensor on a firm part of the loom, in protected position from the bumps. Place the magnet on a rotating part in such position to activate the sensor every turn of the loom. The distance between sensor and magnet has to be from 2 to 4 mm.
2. **<u>Attention that the support is not vibrations subject!</u>**
3. The magnetic sensor has to be connected one wire to Ground and the other one to green wire of power supply cable.
4. If it is all fine then the writings (Magn) appear on display at each loom turn , and the display show the right rotation speed.
1. It is not important the position where magnetic sensor and magnet coincides related to optic head position. It is enough if they match on each turn. The magnetic sensor is always used for the dropped stitches / ladder detection.

This instrument use only one magnetic sensor even if there are two optic heads/scanners.

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Explanation of error messages

" BIG HOLE Sc.(1 or 2)"
The Scanner 1 or 2 has noticed a defect great enough to produce a lot of signal . The loom is therefore immediately stopped to point out to resolve the problem.

" SMALL HOLE Sc.(1 or 2)"
The tool has noticed a defect in the fabric not so great to have immediately to stop, but the sum of small holes has reached the limit planned in the special page . The loom has stopped therefore to point out to resolve the in relief problem.

" LADDER Sc.(1 or 2)"
The scanner/optic head 1 or 2 have noticed for three consecutive turns a defect in the same zone of fabric, and the loom has stopped therefore to point out to resolve the problem.

"ERROR:DISAB.JUMP OR + HOLE LEVEL // OR + TEARS LEVEL"
The tool stops because it has the jump of discarded needle enabled but it doesn't succeed in seeing the defect caused from discarded needle. There are two possible causes:
   · The sensibility planned for the optic head is too much low and doesn't even turn on the red light when discarded needle passes in front of the optic head. So increase the sensibility for holes, or the sensibility for tears, as pointed out by the message, until the corresponding red light flashes at every turn.
   · The discarded needle it is not present in the loom nor in the fabric. In such case disable the jump with the key 'Jump', the yellow light has to be turned out to confirm that the jump is disabled.

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