

# AG14-4C

## NOTES OF OPERATION

## Indice generale

General description.....	2
Main unit AG14:.....	3
overview of the device :.....	3
Display:.....	4
keyboard:.....	4
Adapter module:.....	4
optical heads:.....	5
Magnetic Sensor and permanent Magnet:.....	6
Use of the main unit. ....	7
Assemblage of the device.....	9
Memorization of reference data.....	10
Regular operation and stop of the production.....	11
Seek of the broken needle and reset of the instrument.....	12
Cleaning of the heads.....	12
Advanced functions of the main unit.....	13
Password.....	13
Password selection.....	13
Turning off the main unit.....	13
Output relay blink.....	13

## General description

The device Agotex AG14 is installed on Circular Looms for the production of fabrics , both mono and double front and with whatever type of sweater, with the purpose to notice the breakup of the heads of the needles and to stop the production.

It is composed of:

- Main unit AG14
- Adapter module for optical heads
- Magnetic sensor of precision, that is activated by a permanent magnet
- Optic heads placed close to the heads of the needles by special mechanical supports, a head for each series of needles to be checked (From 1 up to 4 heads at the most).

The heads connect to the main unit through the adapter; the magnetic sensor points out the conclusion of a turn of the loom or textile machine .

The microcontroller main unit handles to count, memorize and verify the number of present needles in two turns of the machine (two turns for best tolerance to random errors).

When the device individualizes some needles with the broken head it points out on the display the number and it immediately stops the loom, or it stops the loom so that the first broken needle is placed in a select zone, it depends as the device is set up.

The data and the regulation of the device can be protected with a optional password .

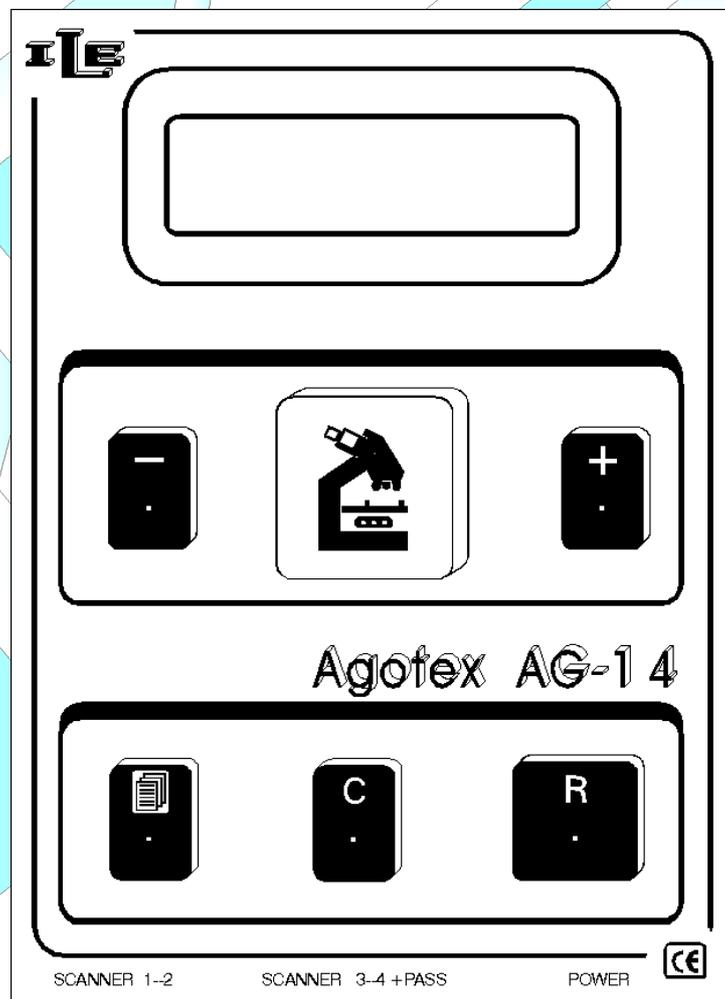
Note: The device detect the number of the broken needle only for scanner 1 and 2, and it stops in correspondence of the broken needle if the loom works under optimal conditions (regular speed).

## Main unit AG14:

Technical characteristics:

- Power Supply from 22 to 26 VAC
- Power consumption 10W
- Output port 2A 250V
- Indication on the display of the broken needles number
- optional password for data and set-up
- It counts up to 40000 needles for head and it works fine on speeds between 10 and 70 turn-minute.
- Languages Italian, English and French .

## overview of the device :



## Display:

The present messages on the display vary according to the state of operation. When the loom regularly turns the display it shows the message 'Counting.. .OK' and to the left it points out the present heads (up to 4 heads). The count and the relative verify take place in two following turns of the textile machine.

## keyboard:

The functions of the keys are the followings:

- 'Page' key to flow the various visualizations or pages .
- Key 'R' , it restores the normal operation of the device after a block and if pressed for a long time (5 seconds ) it disable the device.
- The keys '+', '-', 'C' are used for set up the data in the various visualizations or pages.
- The key 'C' it also serves for memorizing the number of needles to count when the device show the correct page.

## Adapter module:

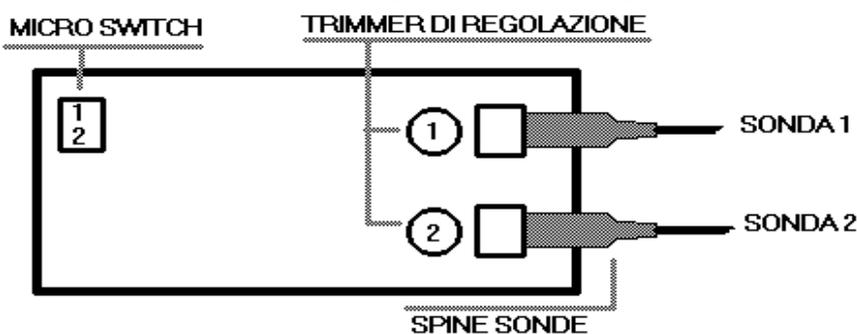
It connects the optic heads to the main unit and it is furnished with a regulation of sensibility for every optic head .

The red and green lights ( LEDS ) present on its front serve for the regulation of the sensibility of the heads, regulation to be performed during the installation.

Inside there are four micro switches (or dip-switch, two for each head ) that, in position ON, serve for optimizing the operation of the system when the type of sweater produced foresees some very long voids between needle and needle.

Therefore with total presence of needles, both in coasts 1:1, the micro-switch it will stay in the position OFF.

When inserting the heads into the form adapter it is necessary to respect the position of entrance of the connector (stings red probe with point red form). Handle with care and avoid to force the connectors .



*Top view of adapter module*

## optical heads:

The optic heads (probes) must be set with a lot of care in proximity of the head of the needles, and once individualized the positioning (see underlying figure) their support must be held to avoid moves during the workmanship.

The head of the probe must be placed so that it surmounts the head of the needle to a distance that depends on the type of used head:

For heads produced before 2007 the distance it has to be among 1,5 and 2,5mm.

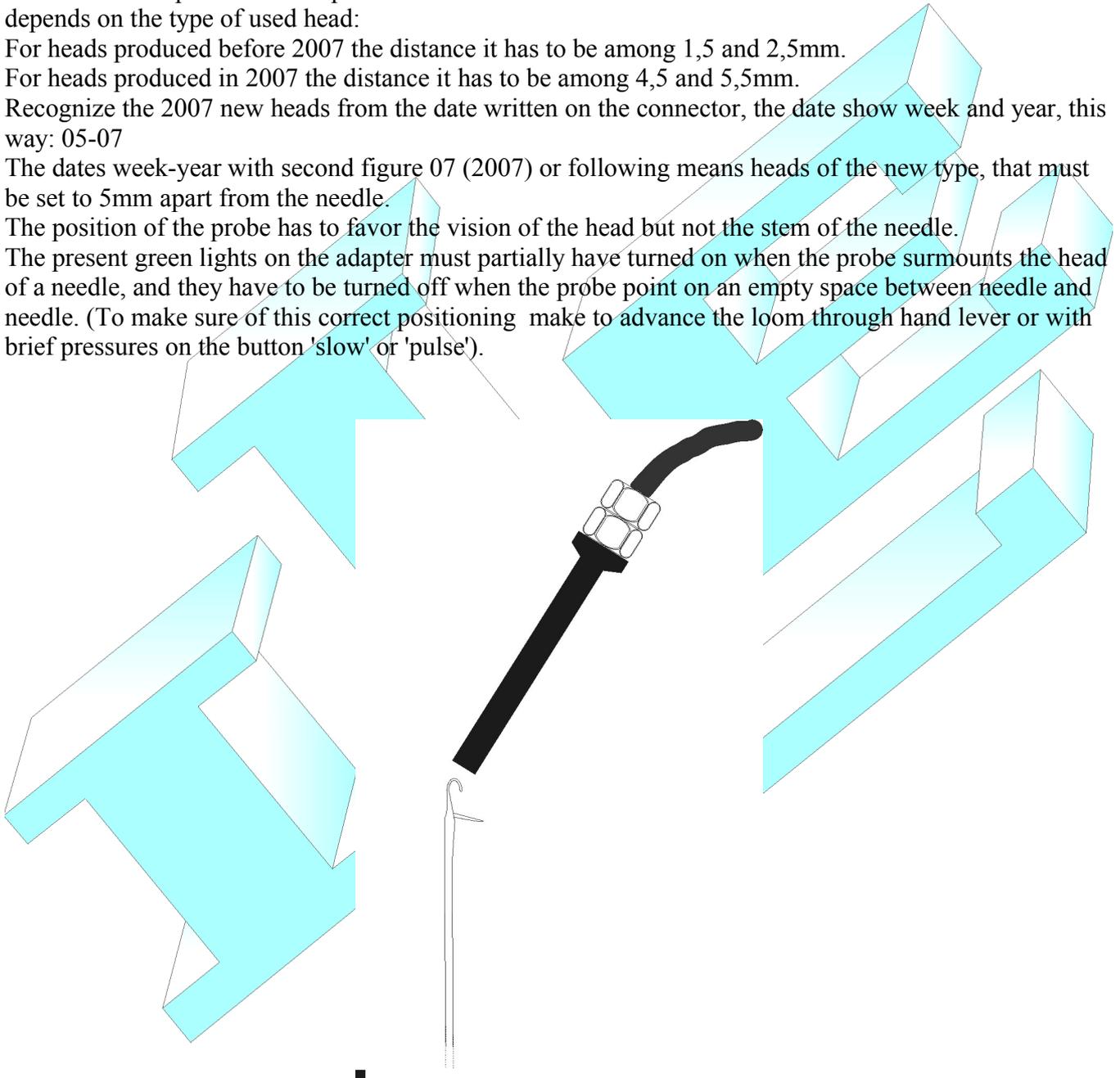
For heads produced in 2007 the distance it has to be among 4,5 and 5,5mm.

Recognize the 2007 new heads from the date written on the connector, the date show week and year, this way: 05-07

The dates week-year with second figure 07 (2007) or following means heads of the new type, that must be set to 5mm apart from the needle.

The position of the probe has to favor the vision of the head but not the stem of the needle.

The present green lights on the adapter must partially have turned on when the probe surmounts the head of a needle, and they have to be turned off when the probe point on an empty space between needle and needle. (To make sure of this correct positioning make to advance the loom through hand lever or with brief pressures on the button 'slow' or 'pulse').

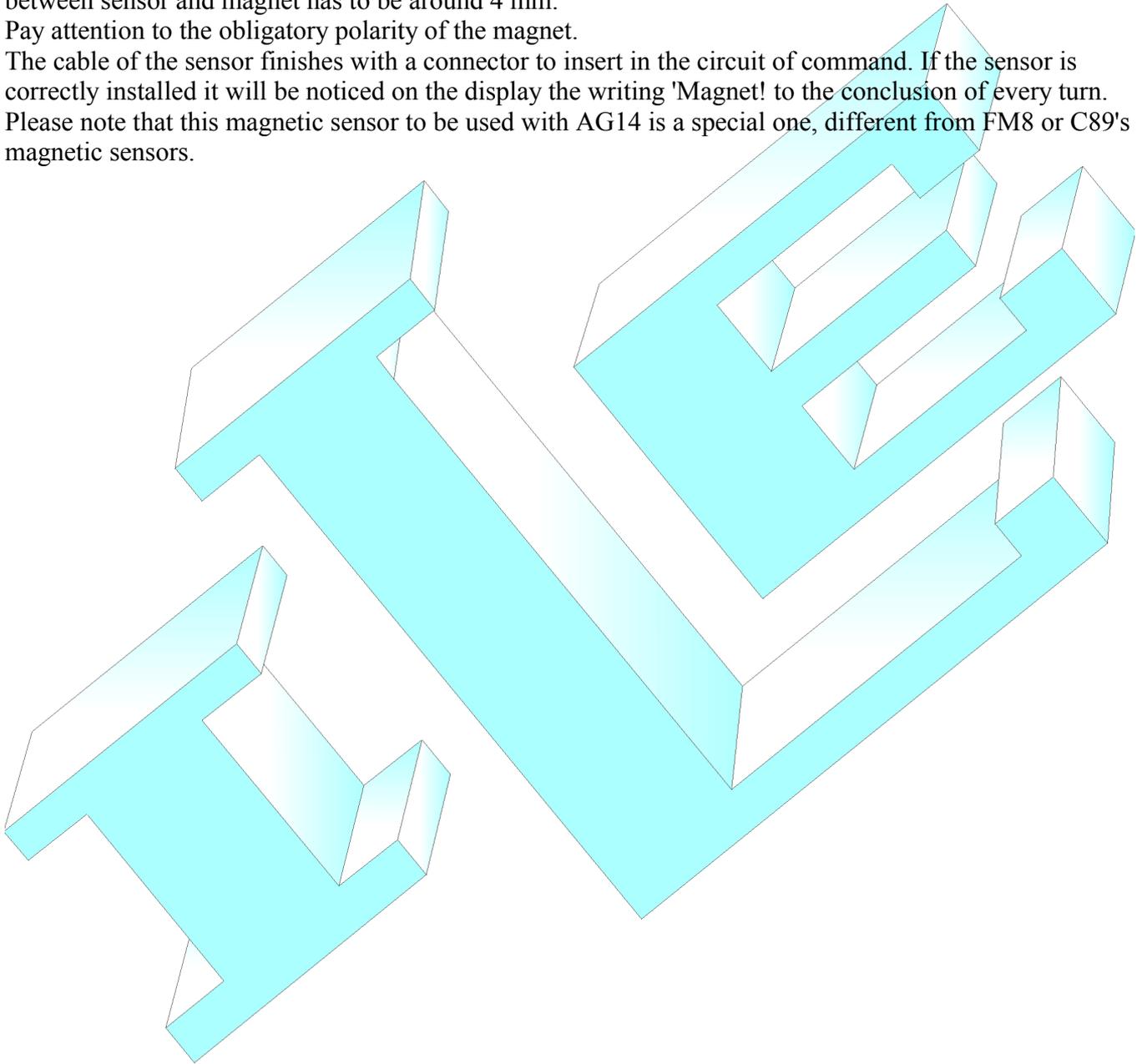


**Magnetic Sensor and permanent Magnet:**

Install the sensor on a firm part of the machine, in protected position from the bumps. Position the magnet on a rotating part in such position to activate the sensor to every turn of the loom. The distance between sensor and magnet has to be around 4 mm.

Pay attention to the obligatory polarity of the magnet.

The cable of the sensor finishes with a connector to insert in the circuit of command. If the sensor is correctly installed it will be noticed on the display the writing 'Magnet!' to the conclusion of every turn. Please note that this magnetic sensor to be used with AG14 is a special one, different from FM8 or C89's magnetic sensors.



## Use of the main unit.

The instrument (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 'Page' having the sketch of the pages.

Here following the description of the various pages, where the pages can be recognized from the writing on the superior line of the display. Note that this description refers to the simplest situation or without foreman password, which is described subsequently.

<i>Page</i>	<i>Description</i>
Initial	<p>This page appears at power-on . It show the state of the instrument ;</p> <ul style="list-style-type: none"> <li>• the writing appears 'Wait for Work' if the device doesn't receive the signal of activity from the machine, because it is stopped, or the wire is not connected.</li> <li>• the writing appears 'Magnet' if the magnetic sensor has given an impulse, or a turn of the loom is finished</li> <li>• the writing appears 'Counting.. OK' if there is the signal activity, the machine is regularly turning and the number of needles coincides.</li> </ul> <p>To the left it is shown the number of present heads; if the head is connected the display show its number, from 1 to 4; if there is a a dot then the corresponding probe appears it is not connected. For instance:            "1." it means that the head 1 is present (connected )            "2." it means that the head 2 is present            "12" it means that the head 1 and 2 are present            the same in the underlying line for the heads 3 and 4.</p>
Needle memory	<p>It points out the number of needles memorized for each head. For every head or probe it show her own number of needles to count and verify. This page serves only to read such number (you cannot modify it here, but then in other pages). This page repeats so many times how many the present (connected ) probes are.</p>
CountS1= CountS2= CountS3= CountS4=	<p>Here the device counts the needles for the suitable probe on the display and visualizes the total number of it every 2 turns of the machine. When the device shows this 'pages of installation' it doesn't verify the number of needles (it doesn't stop the machine), but it count them and eventually memorize the number. In fact pressing the key C' the display writes 'MEMORIZZ', and the number of needles counted is set in 'memory needles' for the visualized probe. This page repeats so many times how many the present probes are.</p>

<i>Page</i>	<i>Description</i>
StopBrkNeedle	<p>In this page must be specified the percentage of turn among the position of the scanner and the point in which the stop of the broken needle is desired. Such distance or arc must be measured in the sense of rotation of the needles, and it must slightly be decreased in base to the inertia of the machine. Input the desired number with the keys '+' and '-'.</p> <p>If the percentage is 'Zero' , then the machine stop immediately and the broken need is placed in a random position .</p>
Error output	<p>Here you can specify if in condition of stop of the machine the output relay must have maintained fixed or has to blink. It changes with the key 'C.'</p>
Maintenance	<p>A number of turns can be input here, at which the device stops the machine to ask for a maintenance. With the key 'C' the number is modified, the key '+' it increases the number pointed by the cursor while with the key '-' makes flow the cursor to the following figure. Pressing the key 'C' the number is memorized. A number equal to Zero disables this function.</p>
speack language	<p>Imposes the language (English or Italian or French).</p> <p>To application other languages can be included, but the maximum number of present languages simultaneously in the device cannot exceed the number of 3.</p>

## Assemblage of the device

1. Choose a position for the main unit that is firm and visible. Unscrew the two screw placed on the sides, and separate the front panel of the device from the hull in black metal, making slip downward the front panel . Put aside the Front panel, handle with care.
2. Fix the black metal hull to the select place, avoiding leaning screw toward the inside of the device. Clean possible metallic shavings due to the workmanship, and insert again the front panel in the metallic hull. Fix the front panel with the screw previously removed.
3. Plug the power supply cable to the main unit; the black cable with 3 wires and the terminal block in head must be connected to the magnetic sensor, connecting the white to the white, the brown one to the brown one, the screen to the screen; the grey cable with 7 wires must be connected here according to the suitable instructions following and to manual end.

Wire	Function	Connection
Brown	power supply input -	to the 0V of the transformer of the services of the loom
Red with fuse	power supply input +	to the 24V of the transformer of the services of the loom
Black or Orange	Activity Input signal	to 12V o 24V available only when the machine is turning
Yellow	connection to GND	to protection earth (PE) or ground
Green	Needle protection Input	to Needle protection device (option )
Blue with fuse	Stop output relay +	Note 1
Bianco	Stop output relay +	Note 1

Nota 1 : the “Stop output relays” are the two pins of a contact of relay, selectable 'normally open' or 'normally closed' through the pages of the device. Such contact of the relay doesn't have inside connections to the device, and it is isolated therefore from GND and from any other signal. Use to stop the machine .

1. Install the adapter or the two adapters (in the case of 3 or 4 heads) in the proximities of the optic heads, in position that it is of easy access, allowing the sight of the leds on the front .
2. Install the cylindrical supports of the heads in a stable way (eventually through perforation on the sector).
3. Install the heads according to the suggestions already statements in the above description of the parts. Their supports allow any movement. For every loom it will be opportune to adapt the wands of metal so that to make her the shortest possible. We remember that the heads don't have to prevent the access to the needles from the apposite panels, they don't have to hamper the movements of the guide-threads and don't have to be joined with the ring of the guide-threads, so that to avoid that the adjustments of the same don't alter the distances between heads and needles.
4. Connect the heads to the adapter(s), and the adapter(s) to the main unit. Turn on the instrument for advance to the regulation of the device and memorization of reference data.

**Warning:** Avoid to make the cables run near the cables of power supply to the loom (380 V ) and avoid to pick up the excesses of length rolling up her. Stretch well the cables.

## Memorization of reference data

The main unit counts the present needles in two turns of the loom and compares them with the memorized datum, this for every probe or connected optic head.

To memorize the correct number of needles it is necessary to use the keyboard and the display of the main unit so that to access the special pages of installation heads.

We recommends to read the part 'use of the main unit' first exposed.

Then follow the indications here available:

- To begin the installation, power on the instrument .
- Press the key 'Page' to flow the various present pages, until it reaches the page 'Conta\$1 =.....'. This message points out a 'page of installation'. It can be necessary to insert the password , as described later in this document.
- The device counts the needles for the suitable probe on the display and visualizes the total number of it every 2 turns of the machine. When the device shows these 'pages of installation' it doesn't verify the number of needles, but it limits to count them and eventually to memorize them.
- Press the key 'page' until appear the 'page of installation' related to the probe that is desired to install.
- Start the machine .
- In such page at every couple of turns the number of counted needles remains on display for 2 seconds ; pressing the key 'C' the display writes 'MEMORIZZ', and the number of needles counted is set in 'memory needles' for the visualized probe.
- If the number of needles shown doesn't correspond to the reality, intervene on the present potentiometer inside the adapter that corresponds to the visualized probe; then increase or decrease the sensibility of the probe until the instrument count the exact number.
- If he doesn't succeed in getting the exact number it will be useful to check or modify the positioning of the probe and the distance from the needles .
- When the counter is correct press again the key 'C', the display writes again 'Memory = visualizing the new amount just saved.
- The installation of this probe is complete, others of it can be installed or return to the normal page with the key 'Page.' After a time-out the device returns itself to the normal operation.

## Regular operation and stop of the production

The block of the machine happens if the device notices for two couples of consecutive turns a greater difference of 1 among the number of counted needles and the data saved in memory.

The device counts and verifies the needles regardless of any operation that is performing through keyboard , except in the following cases:

1. the instrument show a 'Page of installation.'
2. the instrument is disarmed through the key 'R', see relative paragraph.
3. the instrument doesn't receive the signal of activity, and in such case the display shows the message 'WaitForWork'

When the device notices the breakup of the head of a needle the block of the machine can be immediate or delayed so that the broken needle is placed in a pre-arranged position.

Opportunely programming the device it will involve in the select way during the block:

- If the immediate block is desired, for instance to avoid to produce material defective, set the device writing '00' in the page 'StopBrkNeedle.' During the block the display will point out the number of counted broken needles however.
- If the positioning of the broken needle is desired set up the device writing in the page 'StopBrkNeedle' the percentage of turn among the position of the probe and the point in which the stop of the needle is desired. Such distance or must be measured in the sense of rotation of the needles. Please note that the instrument activate the stop of the loom when the broken needle is in the programmed position, then loom inertia will move it further to a distance which depend also from loom rotation speed. Also in this case the display points out the number of broken needles counted in the last couple of turns.

After the stop of the machine, the instrument shows a message like the following example:

<b>E</b>	<b>R</b>	<b>R</b>	<b>.</b>	<b>S</b>	<b>C</b>	<b>A</b>	<b>N</b>	<b>.</b>	<b>1</b>	<b>-</b>	<b>2</b>				
<b>B</b>	<b>R</b>	<b>K</b>		<b>N</b>	<b>E</b>	<b>E</b>	<b>D</b>	<b>L</b>	<b>E</b>	<b>'=</b>	<b>4</b>	<b>4</b>	<b>0</b>	<b>6</b>	

The upper line show which scanner give up the count error, and it show also the number of missed ( broken) needles.

The lower line is available only for scanner 1 and 2, and it shown the progressive number of the broken needle, counting from the needle under the scanner when the magnetic sensor and sensor coincide. In other words, rotating the loom so that the magnet and magnetic sensor coincide, in that position of the loom the count begin with the first needle placed in front of the scanner, and goes up with the other needle that flow under the scanner with the rotation of the loom.

If the lower line point to needle number 'Zero', than the device was unable to find the broken needle. The function of search and positioning related to the broken needle can be prevented by troubles of various nature (Speed of the machine irregular or out limit 10 - 70 giri/mins., folded up needles, device just turned on).

The stop of the machine can be removed pressing the key 'R', if the instrument found the broken needle then it will appear the message described in the following section .

## Seek of the broken needle and reset of the instrument.

As explained above, the block of the machine happens if the device notices for two couples of consecutive turns a greater difference of 1 among the number of counted needles and the data saved in memory.

After the instrument stopped the machine, pressing the 'R' key the instrument release the machine and show a message for help in seeking the broken needle, if found:

B	R	K	.	N	E	E	D	L	E	'=	4	4	0	6	
S	C	N	1	.	N	E	E	D	L	'=	4	1	0	3	

The upper line show again the number of the broken needle, the lower line show which scanner is referring to and the number of needles counted from the beginning of the turn. In this way it is easy to move the loom by hand and check the number of needle counted, stopping when the broken needle is reached.

Note that there is a tolerance in the indication of the broken needle; the broken needle is around the shown number in the range from minus 6 up to plus 6.

Press the key 'R' for 2 seconds to reset the instrument and return to normal operation.

## Cleaning of the heads.

With the progress of the job in the time, in case of dusty yarns, there is the danger that the dust obscure progressively the heads, causing a lowering of sensibility (this is underlined by a decrease of brightness of the leds on the form adapter).

It is useful to handle the cleaning of the heads with regularity, for instance every piece, with spun of middle cotton. Or clean the heads blowing with compressed air or, if dirty of paraffin, clean the optic part brushing with a clean and soft rag.

## Advanced functions of the main unit

### Password

The password or secret code can be required when using the page key , in order to access the pages of installation.

Correctly inserted it allows to pass to the following pages.

To insert the code to use the keys '-' and '+' to move the cursor and to modify the digit pointed by the blinking cursor.

Press the key page when finished. The password can be disabled.

### Password selection

The code must be chosen considering that the code '0000' means to disable the password, that therefore is never asked.

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

1. While the device is turned on and display the initial page, unplug the connector of the adapter 3-4 and insert the key of password furnished with the device. The machine has to be stopped , or on the signal in entry of 'activity' it doesn't have to be any voltage.
2. The special page will appear.
3. The password is a decimal number of 4 digit . The key '+' increase the number pointed by the blinking cursor . The key '-' move the blinking cursor to next digit. Pressing the key page the password is memorized and the writing 'new inserted password is visualized.
4. Unplug the key of password so the device brings him to the initial page and the password is memorized.

In fact the password is trained if different from '0000.' Then to disable the password just input a new password equal to '0000.'

The device is furnished with password of default planned to '0000, such password allows the unconditional access to all the pages.

### Turning off the main unit

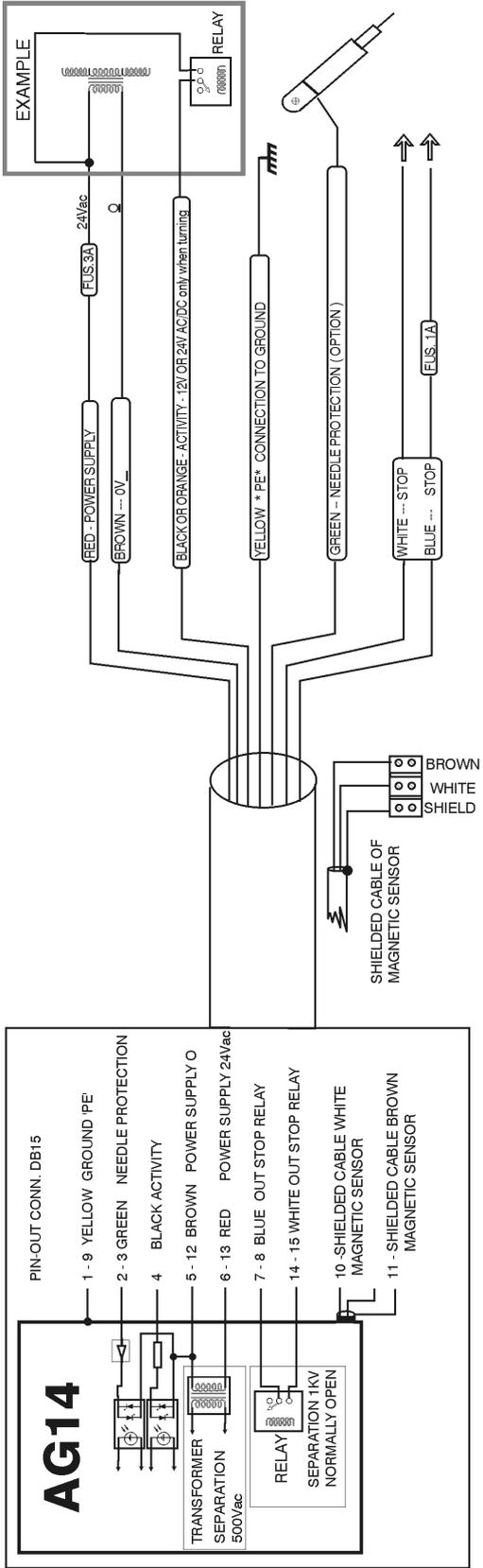
The device can be disarmed pressing for a long time the key 'R.'

The display shows the writing 'turned off by operator.' To reactivate press the same key for a long time.

The device remains turned off indefinitely even if powered off and on .

### Output relay blink

There is a page in which is possible to choose if, in condition of stop, the output relay must have maintained turned on or has to blink (to give greater visibility to connected lamp).



SUGGESTED CONNECTION FOR OLD MACHINE NOT COMPATIBLE WITH NEW STANDARD

