

Accepted legend.

The word « Attention! », allocated by the *italic font*, marks out ability of potential danger of coder fault or working efficiency. Represented on the LCD examples display current operation of the device. They look like:

PKSC	Rt	HVCORPM	-status-
0.00	00	++ W	HydrOff

[Power] — the text, allocated in square brackets, means necessity of single push of the specified button.

[H] [P] — necessity of consecutive single push buttons.

[Ctrl]+[Del] — necessity of simultaneous push of buttons. For example, [CTRL] pushed the first, then not releasing [CTRL], [DEL] is pushed and kept on. After pressure of last button in sequence, all buttons are let off.

<...> — either « group of sampling » (it is described below) or ability of text string (or numerical value of parameter) input. If input value should be in the given range, the range is given by two values, divided by dots.

<[Enter] / [Esc]> — « group of selection » i.e. an opportunity of selection to push either one or other button, depending on required result.

Designations of:

[Setup] [P]

[C] — command 1

[D] — command 2

[H] — command 3

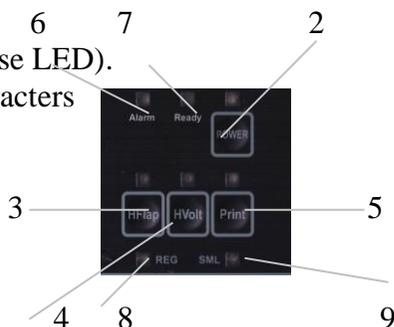
It is necessary to understand as follows: after consecutive push of buttons **[Setup]** and **[P]** there is an opportunity of selection. Button **[C]** push will result in command 1 execution, button **[D]** push will result in command 2 execution and so on.



Control keyboard panel

1. Character LCD-indicator (2 lines x 24 characters)
2. Power button with the LED indicator
3. Jet switch button with the LED indicator
4. High voltage switch button (print allow) with the LED indicator
5. Print button with the LED indicator
6. Alarm LED.
7. Ready LED(phase LED).
8. Top/Bottom characters LED.

9. Caps Lock LED.



LED description

№	LEDname	condition	Coder operating mode
	POWER	Not light	Power circuit is switched off/disconnected or damaged
		RED	Sleep mode
		<u>GREEN</u>	Operating mode
		ORANGE	Power switch on/off process goes on
	ALARM	<u>GREEN</u>	The coder is OK
		ORANGE	Warnings – look at the indicator !
		RED	Work is stopped – alarm situation
	PRINT	GREEN	Printing is in process
		ORANGE	Printing with max speed excess
		Not light	Wait mode
	HVolt	Not light	Switched off, the cover is opened
		<u>GREEN</u>	Switched on, the cover is closed, Printing is allowed only when green !!!
		ORANGE	Switched on, the cover is opened
		RED	Switched off with closed cover
	HFlap	RED	Jet is switched off
		<u>GREEN</u>	jet is switched on
	READY	<u>GREEN</u>	The coder is ready for printing
		ORANGE	The coder is in check mode
		RED	Error
	REG	LIGHT	Lower register
		Not light	Upper register
	SML	LIGHT	Capital
		Not light	Lower case

Connectors and control switch

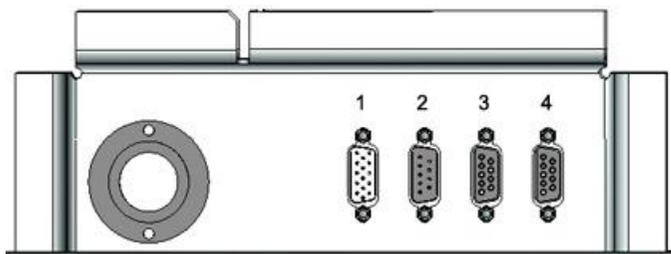
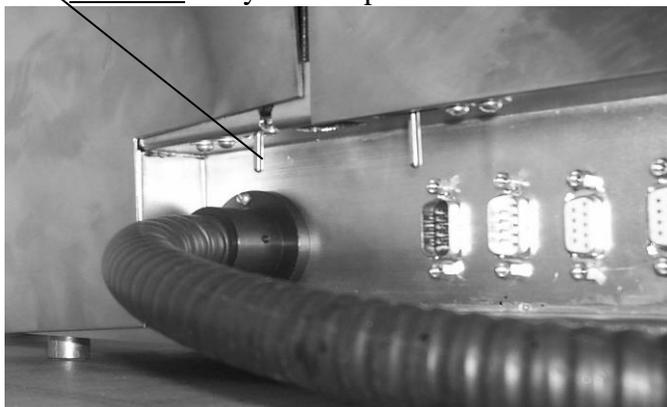
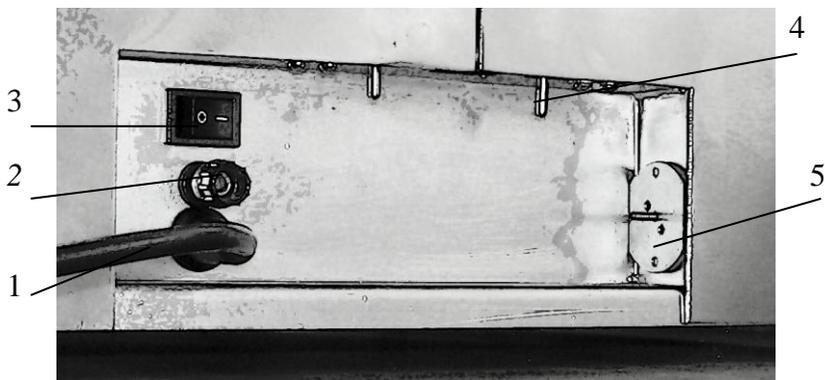


Fig. 2. External connectors (left niche)

1. 15-contact connector [type DHS-15M (plug XP2)] “Alarm” (“Message select parallel port”- optional function);
2. 9- contact connector [type DB-9M (plug XP1)] «RS-232 interface»;
- 3, 4. 9- contact connectors [type DB-9F (plug XS5 and XS6)] «SENSOR 1 » and «SENSOR 2 » for external «Printgo» sensors, external encoders and “Print direction” connection. Both connectors have the same pin connections. Look at p.40 for connectors electrical drawing and external connections.
5. Left lock of hydro compartment



Connectors 3 and 4, power supply 24V and 5V contacts are intended for “Printgo” sensors, encoders and other external devices. Power consumption from 24V must not exceed 200 mA, power consumption from 5V must not exceed 0,5 A.



Right niche

1. Supply cable with the triple plug,
2. «Ground» terminal,
3. Supply switch,
4. Right lock of hydro compartment,
5. Air connect pipe for printhead excessive pressure creation.

Use air connect pipe with aquarium air pump when air near printhead is dusty or wet.

External connections

Power connection

The coder supplies from AC (110... 260 volt) or DC (110/220 volt). Voltage brownout more than 0,3 seconds switches the coder to sleep mode.

Use EURO triple socket with ground connection. Check if your mashinery, where coder is maintained, is reliably connected with ground. If there is no ground wire in your power socket, you must make ground connection to the coder

Ground terminal. If printhead is maintained rightly onto your mashinery without any isolation, connection point of ground wire should be closely at printhead.

Coder switching on without correct ground connection can damage the coder.

External printgo sensor connection

Message printing occurs from the photosensor, which is included in a complete set of the coder. Plug its connector into c3 or c4 (fig. 2) and fix by a screwdriver. Then maintain the photosensor at 3-4 cm distance from the printed object and check its working.

If you have another photosensor or printgo device, look at the EXTERNAL CONNECTION drawing to make your own connection cable. We use NPN output sensors. If you have sensor with another output, call for your service center. There are some differences of NPN, PNP and active output sensors connection. Look to the p.40 of this manual for more info.

Uncorrect printgo connection can damage the coder.

External encoder connection

The coder's prints rows of a message either from internal or from external synchro pulses. The length of the printed message will be changed with speed of the marked object when using internal synchro pulses. The only way to make the message length constant - to use incremental encoder, which converts the real conveyor speed into the synchro pulses frequency, and then to apply these pulses as synchronization for the rows printing. Connection should be done as showed in the EXTERNAL CONNECTION drawing. We recommend NPN or active 5V output encoders. Another types can be connected according to recommendations of your service center.

Uncorrect encoder connection can damage the coder.

Encoder should have enough pulses to regulate the printed message length. Usually it is enough to have 1 pulse per 0.1 mm of the marked object transference. Max pulses frequency should not exceed 100 kHz.

Do not forget to switch external synchro on by switch. Now it is hidden in the hydro compartment.



Now external synchro is ON (down)



Now external synchro is OFF (internal synchro generator is used)

Connection of the external print direction

Connection of an external print direction signal is the same to external encoder connection. It allows to change printing direction without operator actions when using bidirectional movement conveyors, and to use the encoder ability of quadrature (order option **).

External interface connection

We use RS232 with two wires as external interface. Call for connection details and protocols. You can use our free software on our website **www.mapspb.ru** to load your own logo and to control the coder by the computer.

Installation requirements of the coder

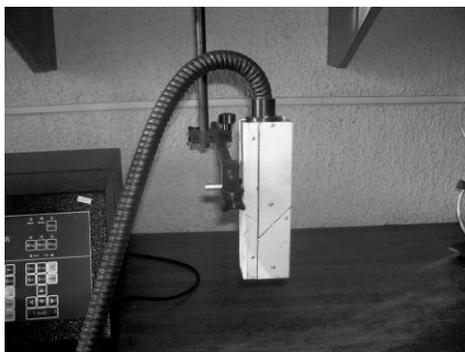
The coder should be maintained in normal environmental conditions:

- the ambient air temperature should be +10-+35 °C;
- relative humidity up to 90 % at temperature 25 °C;

The printhead usually should be mounted from horizontal



(slightly sloping downwards a face part) up to the position, at which the face part (with the exit of a jet) is inverted vertically downwards.



The distance from the end face of the printhead up to marked object should be 5-40 mm.

Avoid printhead maintenance in places with strong sound, high vibration, heating or electromagnetic waves.

The control unit and the printhead should be mounted on one level. The allowable difference in levels of installation - 1 m. Printhead should be mounted some higher than the control unit. Movement of marked objects should be directed on the printhead cover at direct printing and from it at reverse printing. Mounting of the printhead should provide easy access to its cover to observe drop creation process through a lens and to open and serve the printhead.

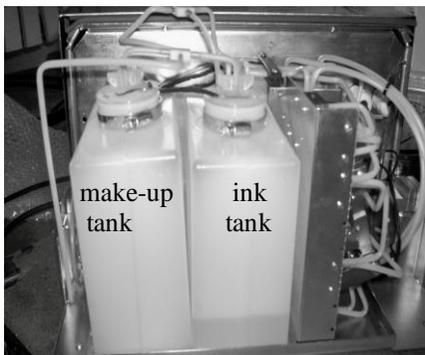
The photosensor, which is included in a complete set of the coder, should be mounted in any position and at distance of 5-130 mm up to the object. The photosensor works in an infrared spectrum. Sensitivity of the photosensor depends on reflecting ability of a surface and the object form and is defined experimentally. The background, on which the object is distinguished, should have an absorbing surface. If an object is recognized, the red LED at the photosensor appears. Green LED indicates that sensor is connected to coder. When working it is necessary to exclude hard object and printhead (with a hose) vibration. It results in a distortion of a printed message on the object and unstable work of phasing system.

Ink and make up filling

You should use the only ink and make-up which are written to the coder passport. You may change ink and make-up only with the help of service center.

There are two types of ink for the coder: water based ink, which don't need make-up usage, and all other ink, which need make-up. Your coder can be made and specified only for one of these types.

Add ink and make-up at the beginning, if coder asks for it.



Hydro tanks

1. Open hydro compartment cover, pushing the locks in niches and simultaneously pulling up the cover



2. Take off a tank stopper



3. Put the funnel (from the coder parts full set) into the tank and add ink (or make-up) from the bottle.



4. Take off the funnel, put the stopper back to the tank and close the hydro compartment cover.

You should fill tanks according ink/make-up expenditure. Ink tank should not contain ink more then two weeks spend. Add 5-10 ml ink into make-up tank if level sensors don't feel make-up.

Special ink using will need some additional actions. These additional actions are described in additional OPTIONAL MANUAL, which will be accomplished especially for such coder.

Never use make-up and ink with another number, or other liquids. Never let them get into the coder. Small amounts of another liquids can damage the coder.

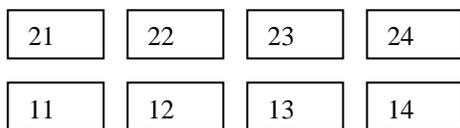
A message description

If you want to make your own messages for the MAK coder and to make it to print what you want to see, you have to understand how to construct a message. Message in MAK coders can be very simple and too complex. But there are some simple principles of printed message construction:

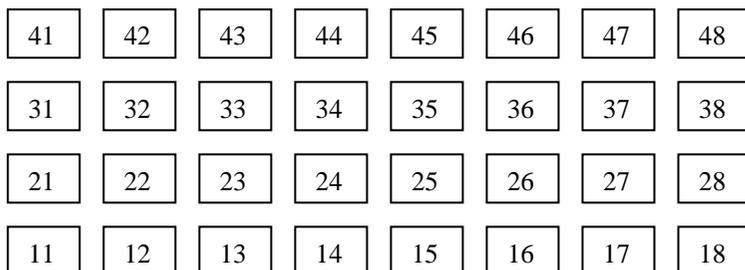
1. Message consists of fragments. We call **the fragment** a character string of the same font or the logo string. Font can take different points amount (5 to 30). Fragment size is not more then 37 characters.

All fragments can have some special function such as up/down counting and timer/calendar functions.

MAK2 message: 2 lines x 4 rows of fragments, 768 points length limit



MAK4 message: 4 lines x 8 rows of fragments, 1536 points length limit



Fragments begin from left down corner.

You should preset the message size (in lines) by “S” parameter value (page).

2. **Vertical rule.** If the fragment font takes more then 8 points high, the fragments of the same row and upper lines, which are taken by font height, will not be printed.

Example:

ABC (fragment 21, font 3)

ABCD (fragment 11, font 2)

If we change the fragment 11 font to 4, we can see such printed message:

ABCD

Fragment 21 has become invisible. Its vertical position is taken by fragment 11.

Note: you can edit fragment 21, set new font for it, but it will leave invisible in printed message until fragment 11 takes its vertical place.

3. **Horisontal rule.**

3.1. The small size font fragments are positioned in the printed message one after another along the spicified line without additional spaces according their numbers.

FR.21FR.22FR.23
FR.11FR.12FR.13

3.2 The high font fragment of next row always passes horisontally the longest fragment of preceeding row.

FR.21FR.22FR.23
FR.11**FR.12**FR.13

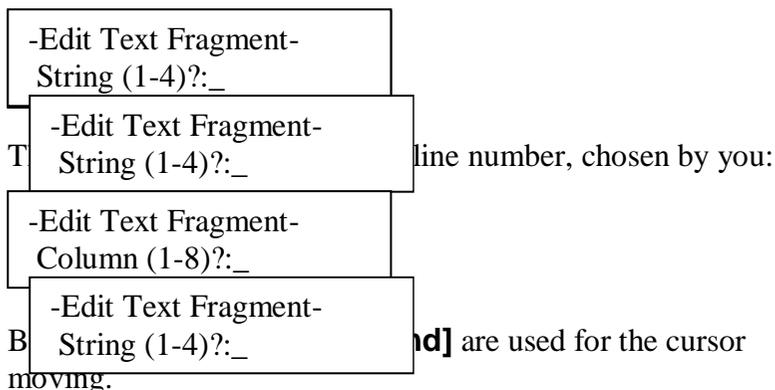
For example, fr.12 is positioned after fr.11 as the most right. And both 13 and 23 are positioned after him.

Text fragment input.

[F1] [fragment line (1 digit)] [fragment row (1 digit)]
 [text (up to 37 characters)] [ENTER]

[Esc] everywhere while text inputting interrupts input.

When you press F1 button, you see at the screen:



All specified operations with the text are made for the fragment edit buffer and do not change the contents of the current

message until you press the button **[Enter]**. By press of the button **[Esc]** completion of a command is interrupted and the previous contents of a fragment do not change.

1. At the entry of the edit mode the initial state of register is « Latin », “lower case”.
2. The type of any fragment is resulted by the last edit command F1,F2,F3,F5,F6. If you preset a counter, edited earlier, by F1 command, the counter will stop its operation. All special options, given by F2,F3,F5,F6, are overwritten by F1.
3. The command **[F1]** is convenient for the current fragment text viewing. Thus, the command should be finished by the **[Esc]** button.

Counter fragment input

1. At first set the counter direction (+1/-1) by a command
<[Setup]><[P]><[N]><[▶] / [◀]>

2. Edit a counter fragment, like usual text.

:

<[F2]><fragment line><fragment
row><text+number><[Enter] / [Esc]>

The last digit in counter becomes the lower digit in counter and **only 15 last digits** of the fragment end become counter (running number in our trade name). Input of new values of these digits into this fragment changes counter value. You can have 2 different counters : incremental and decremental in one message. You can have 2 fragments with the same counter direction in one message, and they will count simultaneously.

The counter clearing

If you want to clear (to zero) counter without other text changing, use the command <[+]><[Y]>.

Reset Running Number? (Y=yes):

If you want to preset not-zero initial value of the counter, edit the text of a fragment by F2 command (do not forget to preset counter direction).

Time –calendar fragment

For editing a fragment with indication of real time and date the command **[F3]** is used.

Thus, the indicator has the following:

-Setup TIME/DATE.-
(Nstring/D/T)?:_

T -Edit Text Fragment-
• String (1-4)?:_

- depends on the picked mode:
- the current date preset: press the button **[D]**;
 - the current time preset: press the button **[T]**.

Editing a time – calendar template.

The Format of inputting of a template of date and time:

[F3] <[1] / [2]><N_o a column><a template of time and date><[Enter] / [Esc]> ,

where: <N_o a column> - figure from «1» to «8»;

Fr:11 time/date 37
_Column (1-8)

The template of date - time is inducting and editing as the usual text in which some symbols at printing are replacing with digital values:

- SS - seconds;
- XX - minutes;
- HH - hours;
- DD - day of month;;
- MM - month;
- YY - year (last 2 figures);

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YYYY - full value of year;

UUU - day of year (Julian calendar);

WW - number of week of a year;

There are some another reserved characters, which can be ordered additionally.

Other inputted characters are printed as the usual text.

Notes:

1. The specified combinations of characters can be placed in the text in any order and inducted one by one or with inserts from any other printed characters. If they are repeated, only last combinations will become the template.
2. If the mentioned above combinations of characters are absent, fragment is printed as the usual text.

The current date preset

For the current date preset a command **[F3] [D]** is used.

The format of the current date:

[F3] [D]<6 figures: DDMMYY>[Enter] , where:

DD - 2 figures (number of day in a month: 01...31)

MM - 2 figures (number of month: 01...12)

YY - 2 figures (last two figures of the year: 00...99)

The current time preset

For the current date preset a command **[F3] [T]** is used.

The format of the current time:

[F3] [T] <6 figures: HHMMSS>[Enter] , where:

HH - 2 figures (hours)

MM - 2 figures (minutes)

SS - 2 figures (seconds)

24-hours system is fixed. If You need 12-hours system, you have to order it.

The fragment font input

For any fragment font change a command [F4] is used.

F4< line fragment number><fragment row>< font number > [Enter] ,

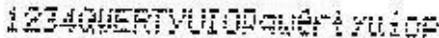
where: font number - DIGIT from “0” to “6”.

The coder is sent to users with 6 -7 built-in various fonts (numbers from “0” - “5”(6)). Usually: MAK2 – 6 fonts, MAK4 – 7 fonts. The font number determines sizes of characters at printing, and is preset individually for each text fragment. All characters of the given fragment are of the same font.

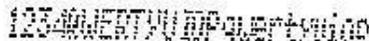
The fragment font leaves constant while the fragment length is not zero. If fragment was deleted, this fragment gets the 1-st font. Fonts 0” .. “3” take only one line of points, “4” and “5” - two lines (14 points), «6» - 4 lines (30 points)

Parameters of the built-in fonts:

- Font 0: height- 5 points, width of characters - 5 points;



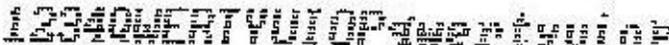
- Font 1: height - 6 points, width of characters - 4-6 points ;



- Font 2: height - 7 points, width of characters – 5-6 points;



- Font 3: dense - 7 points, width of characters – 6-8 points;



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- Font 4: height - 14 points, width of characters - 8 points;
- Font 5: height - 14 points, width of characters - 11 points.
- Font 6: height - 30 points, width of characters - 24 points.

IMPORTANT! Do not change a font of the logo fragment!
After this action the name of a logo (character) will be printed
as usual text fragment.

Loading a graphical logo

For the graphical logo input into the current message a
command **[F5]** is used.

Load Logo Bitmap (code)
string(1/4)?:

Fr:11 -image#?-(letter)

—

Format of input:

F5< line fragment number><fragment row><code
of logo>**[Enter]**, where code of logo - letter of Latin or
Russian alphabets or any used character You can make your
own logo yourselves at your computer and then load it into the
coder.

Editing a fragment with post-date (delayed date)

After pressing on the button **[F6]** the LCD message will
appear:

Fr:11 -date offset- :37

—

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The further order of input depends upon the picked mode:

- input of the date template: set required line number - 1 to 4;
- input of the current date offset: press the button **[D]**.

Editing a template of post-date

For editing a template with post-date a command **[F6]** is used.

[F6]< line fragment number><fragment row><the text of template of post-date>[Enter]

where:

<№ of column> - figure from “1” to “8”;

the template of date-time is edited as the usual text in which some characters when printing are replaced with digital values:

DD - day of month with displacement of date;

MM - month with displacement of date;

YY - year (last 2 figures) with displacement of date;

YYYY- full value of year with displacement of date.

Other inputted characters are printed as the usual text.

Notes:

1. The specified combinations of characters can be placed in the text in any order and be inducted one by one or with inserts from any other printed characters.
2. If the mentioned above combinations of characters are absent the fragment is printed as the usual text.
3. The maximum characters amount is 37.

The calendar offset from the current date setting

For calendar offset from the current date input the command **[F6] [D]** is used.

The format of offset input :

[F6][D]<1..4 figures: offset (days)>[Enter] .

Prestored messages

You can store at least 99 messages into the coder nonvolatile memory. For prestored messages use a command **[Setup] [M]**.

Input cmd-code (letter) R-read/W-save :_

**[Setup] [M][W]<number of message: 01..99>[Y]
[Enter]** – the current message saving into nonvolatile memory
Main message parameters are saved too.

Save Current Mark (01-99) _

This command stores the current message into the flash memory (guaranteed storage time - 10 years).

[Setup] [M] [R]< number of message: 01..99 >[Y]

Load Print Mark(01-99) _

[Ctrl]+<[1]..[9]> [Enter] – fast loading of a message 1..9 from the flash memory.

Command is same to **[Setup][M][R]**, but allows to load nine messages by two keyboard touches.

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Message print direction and correction

[Setup] [P] [M] - entry into a setting mode.

[C] - rows correction of printing on / off (1-on/0-off)



with correction (vertical line is unbroken)



without correction (vertical line is broken).

Try to print and look, what is better for your object speed.

[R] - reverse printing (1-yes/0-no)

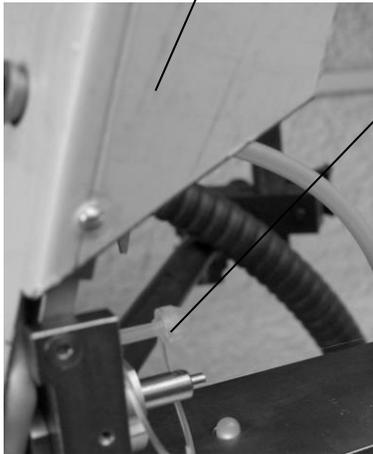
[V] - vertical printed message overturn (1-yes/0-no)

[Y] [Y] for changes saving.

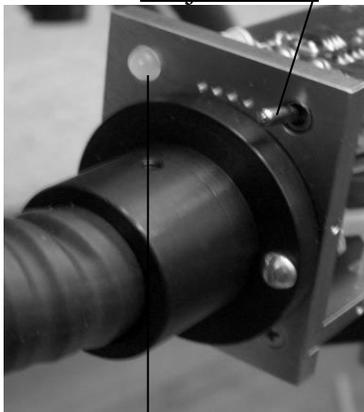
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Switching on and preparation for working

- Insert the plug of the power cord into the socket (220V). Power switch is enough save to leave the plug in the socket constantly.
- Switch on power by **the Power switch**. (see p.5, pos.3)
- Press **the Power key** on the keyboard (see p.2, pos.2)
- Open the printhead cover , put the nozzle cover off.

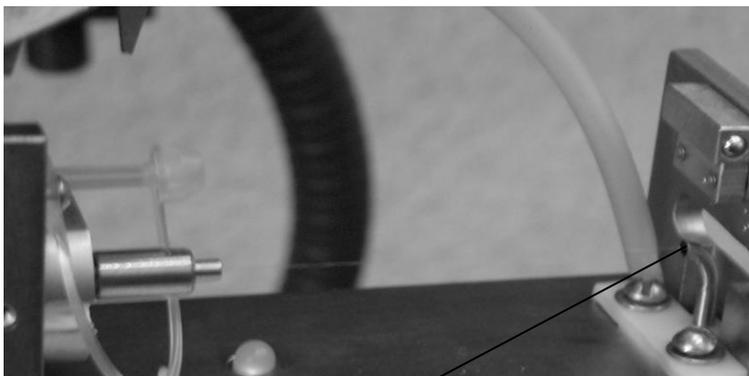


Switch on the jet switch.

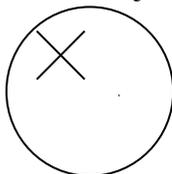


- When indicator backlight switches on, press **Ctrl + W** keys simultaneously. You are to hear valve switch sound. If silence is, try to press Ctrl+W keys again.

- In less then a minute the coder will try to switch jet on. Check LED becomes RED .

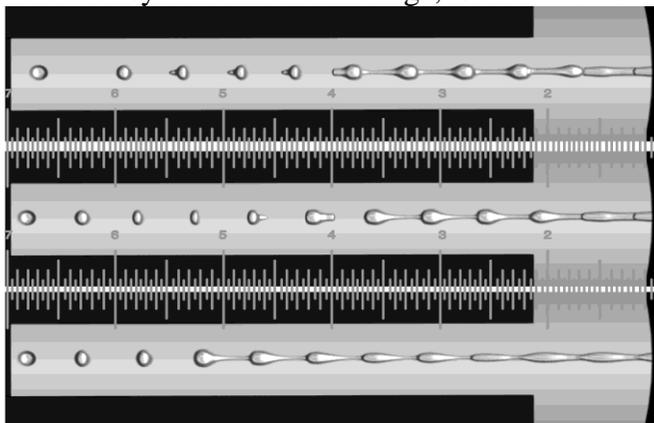


Check the jet gets into the trap, into its left up corner.



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The jet breakpoint occurs in the visible area of the charging electrode. Look at the lens. View of drop-creation, at various values of synchronization voltage, is shown below.



The jet breakpoint

Dependence of position of the jet breakpoint on the synchronization voltage has extreme characteristic. If the jet breakpoint is too far from the charging electrode and gets the deflecting system, there can be an electrization of the jet of drops by a constant field of deflecting electrodes. The jet is precipitating on a surface of electrodes of the deflecting system, or does not get in a trap (changes a path of flight) and fills in internal parts of the printhead.

On increasing of the synchronization voltage, the jet breakpoint approaches to the nozzle (Fig., low and middle pictures). Then disturbance of drops is observed (drops are unwrapped by "tail" forward) and the jet breakpoint is moved from the nozzle, then again to the nozzle, but drop creation is disturbed. This effect is called «overmodulation». Striking example of the overmodulation effect is observed only on water ink. Correctness of phasing is indicated by a character under the letter "F" (Phase)

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in the display modes “0”, “1” и “3” (“Display modes”, p.). After coder switching on there is a symbol “?” and the message « Phasing is not executed ». After the first trial printing the character changes on “N” or “+”. If it has not taken place, it is necessary to make some more printing tests, observing for the character under the letter “F”. If the character “N” has appeared or toggles after trial printing, it is necessary to be convinced that:

- 1) charging electrode is clean and dry;
- 2) the jet breakpoint is like the middle picture of Fig.4.

Position of a printed message on the object surface depends on a mutual allocation of the printhead and the photosensor and the motion speed of the object. At initial coder installation you have to adjust parameters of printing and the jet breakpoint.

The trial printing is possible only if the head cover is closed and High voltage is on (High voltage LED is green).

Some another adjustments may be needed.

There are two main adjustment types:

- drops and printing system adjustments;
- hydrosystem adjustments.

Most of hydrosystem adjustments are hidden from user.

There left only 2 hydrosystem adjustments:

- System pressure;

<Setup> <H> <P> < pressure value, 3 digits > < Y >

- Viscosity limit.

<Setup> <H> <T> < viscosity value, 3 digits > < Y >

! When you change pressure, in some minutes remain and input new viscosity value. Best of all is to input new value which is more, and in five – ten minutes to look throught real viscosity value by <INFO> <H> <T> command and to input it by command, mentioned above.

Printing system adjustments

1. Autostart input

<Setup> <P> <A> < 3 digits> <Y>

Command inputs value of autostart interval (repetitive printing). With the help of 2 commands you can preset the interval value in centimeters:

1. Make some test prints and preset <K> - the horizontal message size,
2. Make a message of 32 zeros of font 3,
2. Print it in specified lines amount,
3. Measure printed message length and input it into <L> in millimeters (by adjustment , 40 - 200),
4. You can input interval value in centimeters (10 – 255).

2. Distortion correction

<Setup> <P> <C> < ▲ / ▼ > <Y/ESC>

Correction - factor 1. This factor is used for 1-st line correction when protective points amount is 0. Usually 20-30. Mode without protecting points is used for high speed printing such as cables labelling. Distance between printhead and object should be as small as possible. *Take care to avoid electrical discharges from object to printhead – they can damage the coder.*

3. Printgo delay

<Setup> <P> <D> < ▲ / ▼ > <Y/ESC>

Small delay between print command and message printing(0-255).Be careful using printgo delay – it is a part of message printing time. Thats why use it when you can't move photosensor or printhead. Real distance less then 2-3 cm.

4. Vertical size

<Setup> <P> <H> < ▲ / ▼ > <Y/ESC>

INKJET CODER «MAK» **USER MANUAL**

- adjustment of a of the printed message vertical size **smoothly**.
Changes step as well.

5. Drop frequency

<Setup> <P> <F> < ▲ / ▼ > <Y/ESC>

- adjustment of the drop frequency . Do not touch without serious reasons.

6. Crosspoints number

<Setup> <P> <J> < ▲ / ▼ > <Y/ESC>

- adjustment of crosspoints number. This parameter allows you to make vertical intervals between lines. Look for table at the end of User manual.

7. Speed (horisontal message size)

<Setup> <P> <K> < ▲ / ▼ > <Y/ESC>

- adjustment of speed (K+1 is pulses divide ratio for row printing). Speed is max if K=0.

8. Conditional length

<Setup> <P> <L> < ▲ / ▼ > <Y/ESC>

- adjustment of conditional message length for autostart mode.

9. Protective drops amount

<Setup> <P> <Q> < ▲ / ▼ > <Y/ESC>

- adjustment of protective drops amount. Usually Q=1 is used. When speed is too slow and quality demand is strong, Q=2 is used. While cable labelling Q = 0 is used.

10. Message lines amount

<Setup> <P> <S> < ▲ / ▼ > <Y/ESC>

- adjustment of printed message lines amount (1- 4). When Q=0 , S always 1 automatically.

11. Test mode level

<Setup> <P> <T> <▲ / ▼ > <Y/ESC>

- adjustment of a test mode level. Set at low sensing limit.

Usual value – 90.

12. The drop breakpoint

<Setup> <P> <U> <▲ / ▼ > <Y/ESC>

- adjustment of the drop breakpoint. Do not touch without serious reasons.

13. Step

<Setup> <P> <Y> <▲ / ▼ > <Y/ESC>

- step adjustment. Gives the message ability to go from the trap.

14. Vertical size

<Setup> <P> <Z> <▲ / ▼ > <Y/ESC>

- adjustment of printed message vertical size(2-16).

<Setup> <P> <Z> <▲ / ▼ > <Y/ESC>- spare (not in use)

<Setup> <P> <Z> <▲ / ▼ > <Y/ESC>- spare (not in use)

Test printing

After the coder switching, message input, adjustment you have to print your message at the paper. Test printing is used for this. Close the printhead cover, press High Voltage button, look at the HV indicator (it must be green), switch on internal synchro pulses (p. 7) and press START button, simultaneously moving by hand with printed material. Look at quality and Phase indicator.

Alarm mask

After inputting **[Setup] [D] [A]** next message:
will appear on the LCD:

Alarm Mask:FVHCLPTJ (1-set) 00000000
--

When «1» is preset under according letter, alarm will be generated on LCD and on ALARM external connector DHS15M, if alarm condition occurs. Connection is in the end of the User Manual.

Reaction of system is toggled by press on buttons :

[F] – no phasing

[T] – probe of a trap

[P] – stop of the pump

[L] – low pressure

[C] – low ink level

[H] – the cover of the printhead is opened(option)

[V] – high voltage defence or damage

[J] – shut down of the valve of the head

Then input **[Y] [Y]** for alarm mask saving.

Output messages language setting

For change a language of a leading-out service messages on the display use a command **[Setup] [D] [L] <[R] / [E]/...>[Y] [Y]**
– language of service messages (R-Russian, E-English,..etc.)

Display template setting

[Setup] [D] [S]<[0]...[3]>[Y] [Y]

The command allows changing the information mode, displayed on LCD:

Pksc Rt Vd Va CP Markcmd 0.00 00 00 00 ↑? 00000 :3

Pksc Rt HVCORPM -status- 0.00 00 ++-----w work

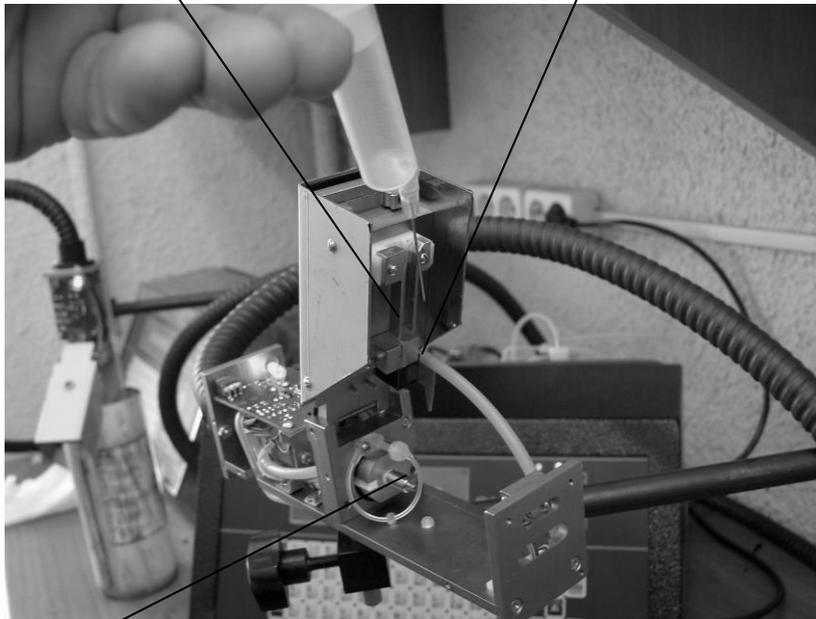
Pksc Rt HVCORPM MarkCmd 0.00 00 ++-----w 000000+

Pksc Rt -status- MarkCmd 0.00 00 work 000000+

Modes can vary slightly in the different program versias.

Daily service

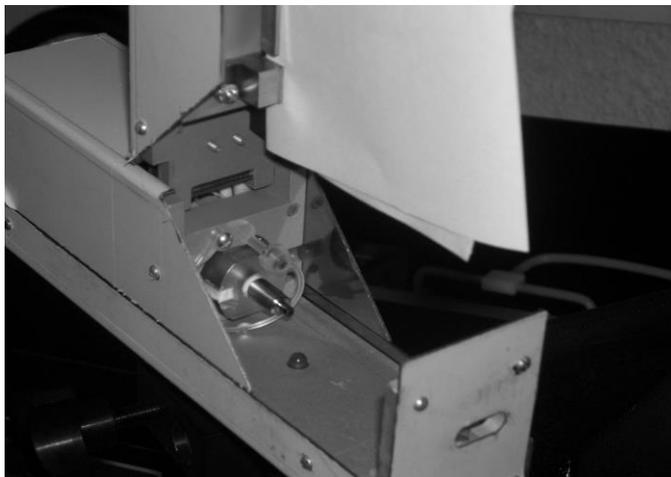
Daily service is to keep clean nozzle, charge electrode, deflecting electrodes and trap zone



nozzle

You should use a syringe with its needle (from MAK spares) and make – up.

Wash the printhead by the syringe and put the nozzle cover on always after working .



Make electrodes dry by clean paper after washing.

The nozzle cleaning

Attributes of the nozzle clogging are:

- 1) Absence of jet after switching on for a long time (there is some delay from switch action and jet switch - wait 10-12 sec until pressure reaches preset value) ;
- 2) The jet does not get into a trap, when switched on the jet “knaps” in various directions;
- 3) Disturbance of drops form, they look like commas;
- 4) Significant change (displacement) of a position of a jet breakpoint;
- 5) Appearance of satellites (small droplets -satellites between the basic drops).

If the fact of clogging of a nozzle is established, it is necessary to clean it.

Attention! Put on the new nozzle only if old one is lost or mechanically broken.

The nozzle is washed out by the syringe given in spare parts. The syringe has plastic connecting pipe. Put on this pipe a piece of a polyethylene tube, length =1-2 cm.

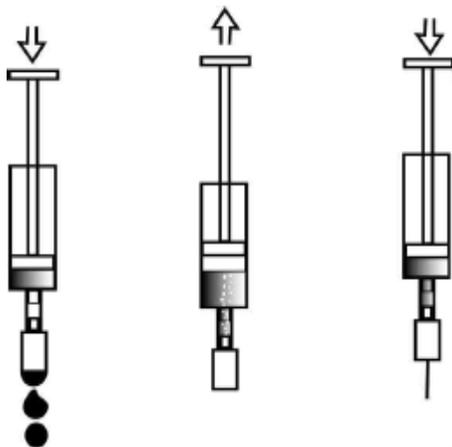
The nozzle is allowable to wash out with strong make-up (acetone, spirit, etc), but final wash **MUST** be made by native make-up (for the coder with water ink – use distilled water).

Prevent hit of foreign liquids into the coder hydrosystem.

Process of washing of the nozzle follows:

1. Delete air from the syringe. Put 2 ml of make -up into it.
2. Turn a nozzle off the drop generator. If it is not turned by fingers, extremely carefully use a pancetta, a horn key № 5 or small pliers.
3. Insert a nozzle into a tube of a syringe, as shown in fig. 13;
4. Put a syringe having a nozzle downwards and direct it into a cleaning glass. Press on the syringe piston so that 3-5 drops were squeezed out from a nozzle.
5. Pull the piston back for air bubbles cleaning the nozzle canal. Look at it - you must see the stream of air bubbles through make-up in the syringe.
6. If air bubbles do not pass through the channel of the nozzle, take it off and put into make-up for 3-5 min. Then repeat 1..5.
7. If air bubbles pass through the canal, press on the syringe piston again. Repeat washing acts until you see a good stable jet without jitter from a nozzle, when you press the syringe piston during 2-4 sec
8. When washing is success, wash the nozzle outside and fill it with native make-up.
9. Wind a nozzle onto the drop generator.

Attention! Make final washing of a nozzle by native (operating) make-up. Wind a nozzle without any tools by two fingers of your arm with limited force until stop.



Nozzle washing

1. Do not put excessive force to a syringe - the syringe can burst at strong pressure or a rarefaction inside.
2. Change a washing syringe after 6 months, put the connecting pipe from old into new syringe.
3. The nozzle can dry, if coder was not used for a long time. Therefore, put a nozzle into strong make-up (spirit, acetone) for 10-15 minutes. After that try washing.
4. Press on the piston during 4-5 sec the jet leaves a nozzle. If after 4-5 sec jet suddenly disappear - the liquid in a syringe is not filtered. In this case washing of a nozzle should be repeated.

The list of specific malfunctions and methods of its elimination

1. There is no message printing.

Look at the HVOLT LED on the keyboard.

- RED – HIGH VOLTAGE is off, printing stopped. Switch on HIGH VOLTAGE by HVOLT key.
- YELLOW – the printhead is opened. Try to close the printhead or check the magnet and Hall sensor.
- GREEN – check another reasons. Check jet, looking through the lense. If jet is off, try to switch it on. Wash nozzle and/or electrodes.

Jet is on, jet breakpoint is OK, all LEDs are green, but printing is absent:

- check PHOTOSENSOR connection and its working;
- check ENCODER connection and EXTERNAL switch position (p. 7).
- check that printed message is not empty;
- check that drops of printed message can fly from the printhead (the printhead face is dirty).

2. Printed message is distorted.

Electrodes are dirty – wash them. Jet breakpoint is not normal:

- try to wash the nozzle without taking it off;
- try to wash the nozzle as described above;
- check if printhead trap zone is clean;
- try to adjust jet breakpoint by **[SETUP] [P] [U]** command.

<p style="text-align: center;">Contact information</p> <p>OOO «Markirovochnie apparaty 193144, Moiseenko str.,22, "D", Saint Petersburg, Russian Federation ph./fax: 7 - 812 - 271-41-88, 7-812-271-30-00 www.mapspb.ru e-mail: map_spb@bk.ru</p> <p>With questions of purchasing of the equipment spares and consumption call: Spiridonov Victor Dmitrievich General Director</p>	<p>ph.: (812) 949-6861</p>
<p>With questions of guarantee and after- guarantee maintenances, and technical consultations call: Stupin Leonid Fedorovich Chief of technical-service department.</p>	<p>ph.: +7 921 770- 1574</p>

B. Calculation of print speed

1. Time of printing of one drop:

$$T_{\kappa} = 1/F \times Q,$$

where:

F — frequency of drop creation ($F = 6000/A$),

Q — number of protective drops (**[Setup] [P] [Q]**),

A — division ratio (**[Setup] [P] [F]**).

2. Time of a leading-out of one column of a character of

the corresponding font:

$$T_{tbl} = N_h \times T_k,$$

where:

N_h — quantity of dots on height of the corresponding font of a character (see tab.).

3. Time of printing of one character with the corresponding font and quantity of lines:

$$T_{symb} = T_{tbl} \times N_w \times S,$$

where:

N_w — quantity of points on width of the corresponding font of a character (see tab.),

S — lines amount.

4. Width of a character at the given linear speed:

$$L_{symb} = V \times T_{symb},$$

where:

V — linear speed of traffic of object (m/s),

L_{symb} — actual width of one character at linear speed of object V .

Table of crosspoints (displacement of the line position (in points))

J (value)	2-nd line	3-d	4-th
0	0	0	0
1	1	1	1
2	0	1	1
3	0	0	1
4	0	1	2
5	1	1	2
6	1	2	2
7	1	2	3
8	2	2	2
9	0	2	2
10	0	0	2
11	0	2	4
12	2	2	4
13	2	4	4
14	2	4	6
15	3	3	3
16	0	3	3
17	0	0	3
18	0	3	6
19	3	3	6
20	3	6	6
21	3	6	9
22	4	4	4
23	0	4	4
24	0	0	4
25	0	4	8
26	4	4	8
27	4	8	8
28	4	8	12
29	5	10	10
30	6	12	12
31	7	14	14
32	8	16	16
33	9	18	18
34	10	20	20
35	11	22	22
36	12	24	24
37	13	26	26
38	14	28	28
39	15	30	30
40	16	32	32
41	17	34	34
42	18	36	36
43	19	38	38
44	20	40	40

