8. MANUAL MODES

8.1. Canul mode (CA, Central cancellation)

The central cancellation is the only mode which is not selected by a software push-button but an independent push-button is assigned for it on the keyboard which is marked //. After pressing it the CANUL message appears in the mode row. After pressing down the START push-button , the mode will be run. So, pressing down the // push-button without further pressing of the START push-button is not enough.

Note:
Eventual run of the central cancellation mode without following pressing down the START push-button may be provided by the PLC program.

The CA mode is the only mode without any movement. After start of the CA mode, the activation of the previously selected part program is cancelled. The CA mode does not cancel the position reference setting.

The CA mode is used to establish the original status of the system. The following functions (if not changed the priority block) are run: G01, G17, G98, G40, G94, G53, G80, G90, M05, M36, M09, M53, M48. This mode may be used to cancel the functions in progress ("FUNCTIONS NOT FULFILLED" indication) e. g. after stopping of the part program in the automatic mode when it is not assumed to continue by pressing down of the START push-button . When indicating "FUNCTIONS NOT FULFILLED" it is not possible to select any other mode except the auxiliary manual travels.

Note:
Function transmitted after CA may be influenced by user setting of the priority block. Setting of the priority block is described in the separate chapter.

8.2. MAN and AUTMAN modes (auxiliary manual travels)

Two kinds of the manual travels are built in the system. The older method is named MAN mode and the new one is named AUTMAN. The setting of the machine constant 233 is decisive when selecting one of two methods. The MAN mode is the older method and it is not used with the new systems. The movement control is practically similar, eventual exceptions are mentioned in the text.

8.2.1. AUTMAN – general description

In the system of the panel software version 20.17 and software version 4.027 (since October 12, 1998), beside the classical MAN mode, also the auxiliary manual travels named AUTMAN are available. It is not the question of the system mode but it is the question of the possibility of the manual travels in the most standard modes of the system. The auxiliary manual travels seem to be the immediate transfer into the MAN modes but without any mode alternation. It is to be seen that the most important usage of the auxiliary manual modes will be in the modes AUT, AUT after stop, AUT – BB and RUP. However, also rapid operative travels e. g. in the CA mode (central cancellation) will be used. The name AUTMAN will be used for the auxiliary manual travels.

The AUTMAN travels are activated by means of the software push-button MAN – manual (see the chapter 8.2.2.) or by the independent push-button with the inscription MAN in the push-button field (see the chapter 8.2.4.).

Note:
With the flame-cutting machines, the AUTMAN travels are activated by the cursor push-button s directly.

The auxiliary manual travels shall be approved by the machine constant NO. 233. If approved the MAN and AUTMAN modes have the same behaviour during the manual travel. Approval of the auxiliary manual travels is manifested by menu displaying for the auxiliary manual travels as illustrated on the following figure.

In the further description the recommended method of control is preferred i. e. the auxiliary manual travels are approved.

8.2.2. Setting of the auxiliary manual travels

To manage and set the auxiliary manual travels AUTMAN, the machine constant 233 is designed.

The first decade	0	Auxiliary manual travels AUTMAN are locked (the system will use the older mode MAN).
	1	Approval of the auxiliary manual travels.
The second decade	0	The external panel with the knob is forbidden in the AUTMAN mode.
	1	The external panel with the knob is approved in the AUTMAN mode.
The third decade		Reserve
The fourth decade	0/1/2/3	Method of movement approval in the AUTMAN mode is controlled by the PLC program (see the PLC manual – chapter "Auxiliary Manual Travels".
The fifth and sixth decades	00	Holding the movement push-button s by means of doubled pressing is forbidden.
	xy	Period for doubled pressing of the movement push-button s to evaluate the holding of the auxiliary manual travels. By the individual pressing the holding is cancelled. Usual setting (multiple of 55 ms) is 08. Example: 8 x 55 ms = 440 ms.
Seventh decade	0	Pressing down the software push-button MAN activates the older MAN mode.
	1	Pressing down the software push-button MAN activates the auxiliary manual travels AUTMAN
Eighth decade	0	Holding the push-button s of the movement by means of holding of the MAN push-button is locked.
	1	Holding the push-button s of the movement by means of holding of the MAN push-button is approved.

Holding the movement in AUTMAN
Under holding, the status shall be understood in which it is possible to continue the movement without permanent push-button holding. The AUTMAN travel allows two holding methods. In the above mentioned machine constant it is necessary to select only one possibility of holding. The holding is not to be activated from the external panel with the knob.

The holding by means of the doubled pressing down of the knob activates the movement. The period between the doubled pressing down of the push-button may be set in the 5^{th} and 6^{th} decades of these constant. The holding is cancelled by pressing down of any arbitrary push-button inclusive of the pressing down of the movement push-button .

The holding by means of pressing down of the MAN push-button . The holding is activated by simultaneous pressing down of the axis movement push-button and the MAN push-button. The pressing order is not important. The holding is cancelled by the pressing down of any arbitrary push-button inclusive of movement push-button s. (without the MAN push-button). When wanting to activate the holding for several axes simultaneously press the MAN push-button first and holding this push-button pressed press the movement push-button of axes which shall run simultaneously. With this holding method it is possible to press down the rapid feed push-button in every time.

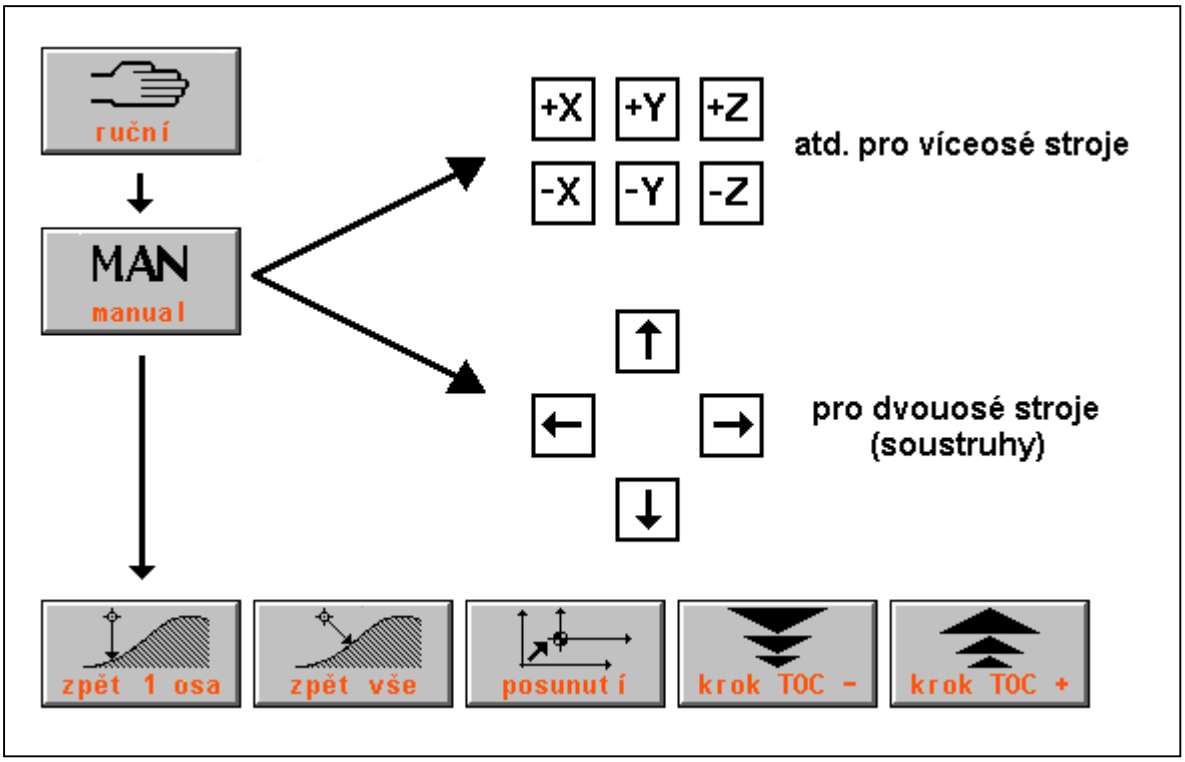
8.2.3. Control of auxiliary manual movements
Activation of AUTMAN is performed either by pressing down the software push-button MAN or the push-button MAN located on the system panel .
Note 1: with the flame-cutting machines it is to be selected by the pressing down the cursor push-button .
Note 2: activation and the complete management of the AUTMAN may be performed by the PLC program too.

From the basic menu, the selection is performed by gradual pressing down of the push-button RUČNÍ and MANUAL. Pressing down of the +X, +Y, +Z etc. the selected co-ordinate starts to be moved in the positive direction. In the negative direction it starts to be moved after pressing down of the push-button s –X, –Y, -Z, - U, -V, -W.

With two-axis machines (usually lathes) it is possible to approve the machine constant (99, sixth decade) using the alternative control of manual feeds by means of the cursor arrows. Setting of this constant it is possible to obtain the compliance of the true directions of the movements on the machine with the cursor arrow directions.

Note:

If controlled the manual feeds with the cursor arrows, it is not possible to select the indication



selection WIN.

zpět 1 osa = return of one axis
zpět vše = return of all
posunutí = displacement
krok TOC = TOC step
atd = etc.
pro víceosé stroje = for multiple-axis machines
pro dvouosé stroje = for two-axis machines
soustruhy = lathes

It is possible to select the simultaneous movement in two arbitrary co-ordinates simultaneously by pressing down then or. for the lathers, pressing down the cursor arrows.

Menu appearing after pressing down of the software push-button MAN i. e. menu of auxiliary manual travels is not used with normal travels in the MAN mode. The push-button s "return of one axis" return of all" and "displacement" are used mainly in the auxiliary manual modes e. g. when interrupting the automatic mode. These auxiliary manual modes will be dealt in the chapter Automatic Modes. The push-button s "step" are designed to select the knob step (see below).

Cancellation of the AUTMAN travels is to be performed by:
- the software push-button "RETURN" in the AUTMAN menu
- the START push-button in the case when the AUTMAN travels are performed in the stopped block (the lamp "FUNCTION NOT FULFILLED" is ON). The START push-button , however, starts the stopped block.
- the start of the CENTRAL CANCELLATION mode

- the selection and the start of any arbitrary mode.
- the MAN push-button (i .e. by the same push-button by which the AUTMAN was selected) in the case only when the holding by means of MAN push-button is not configured.

To stop the movement, the STOP push-button may be used too.

Note:
If the auxiliary manual modes are not approved by the machine constant, the above mentioned menu will be not displayed but only the keys with inscriptions of co-ordinates (older MAN mode method) will be displayed.

8.2.4. AUTMAN possibilities

As already mentioned, it is not the question of any new mode. In the auxiliary manual modes it is possible to travel with the same method as in the MAN mode with the exception that **no mode change is performed**. The AUTMAN mode may be selected e. g. in the mode AUT, CA or RUP even in the case when the mode is not completed i. e. in the STOP status for instance (the lamp "FUNCTION NOT FULFILLED" is ON). In the mode window no MAN mode is activated but the mode is activated which is selected in the moment of pressing (e. g AUT). If the AUTMAN mode is active, the MANUAL inscription is indicated in the actual item window.

Possibilities:
- travels by means of the direction or cursor push-button s on the system panel (see the chapter 8.2.2.)
- possibility of velocity change by new F function entry (see the chapter 8.3.5.).
- influencing of the velocity by means of the F % potentiometer (see the chapter 8.3.5.).
- possibility to use the manual knob for the previously selected co-ordinate (see the chapter 8.3.4.).
- possibility of travel in two axes simultaneously (or one axis and manual knob)
- possibility of return back to the place where the block was stopped in the AUT mode (see the chapter Automatic Modes).
- possibility of the external management from the PLC program.
- possibility of automatic holding of the knob of the selected movement.
- possibility of program path displacement

Note 1:
The auxiliary manual travels may be controlled from the external panel of the manual knob. In this case the manual knob panel push-button codes assume the auxiliary manual travels and they are not transferred into the PLC program (for details see the PLC Manual).

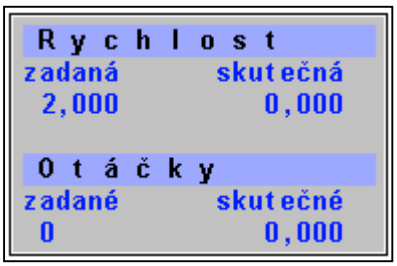
Note 2:
To control the movement, positioning units are used which are implemented in the system. The standard interpolator ins not used and so two co-ordinates are not controlled in the interpolation mode but independently on each other. This property shall be considered mainly when starting the return back to the original place of the previous stop for all co-ordinates for which the return path may not be linear.

For detailed description of the AUTMAN mode see also the Chapter Automatic Modes.

8.2.5. Velocity and the rapid fees of the manual modes

After turning on of the system the velocity for the AUTMAN, MAN and other modes is pre-selected and set in the machine constant No. 54.

The velocity for the manual modes (in the AUTMAN, MAN and JOG modes) may be changed by pressing down of the F push-button and entering new velocity. If the default format for the manual modes is selected the entered velocity is indicated in the field "ENTERED" (see the figure).



The velocity is entered in mm/min. i. e without the decimal point. After entering the velocity is displayed in the format with the decimal point i. e. in mm/min. It is possible to checkup it by repeated pressing down of the F push-button (see the figure).

Rychlost = velocity
Zadaná = theoretical
Skutečná = current
Otáčky = speed
Zadané = theoretical
Skutečné = current

Example:
F2000 is the velocity of 2 m/min. when entering. After entering the 2.000 will be indicated.
The velocity may be (even during the movement) influenced by the %F potentiometer in the range from 0 % up to 150 %.

When pressing down the ^^^push-button during the movement (DEL push-button and "harmonic curve" push-button), the co-ordinate will be run by rapid feed for the period of holding of this push-button . The rapid feed is not influenced by the % F override setting.

8.2.6. AUTMAN travel on the external panel

When connecting an external panel to the system, it is possible to control the co-ordinates from it. By pressing down the MAN push-button (in the push-button field, not in the software field), the AUTMAN auxiliary manual travels will be switched. The pre-selection of the co-ordinate is performed by pressing down of the relevant axis push-button . The movement start in the relevant direction is performed by pressing down of the plus (+) or minus (-) push-button . By pressing down the rapid feed push-button ("harmonic curve") the axis is travelled by the rapid feed.

It is possible to convert into the control of the selected axis by a the knob and back to the control by the push-button s.

8.2.7. Control of travels in AUTMAN by means of the knob

To control the following two methods may be selected:

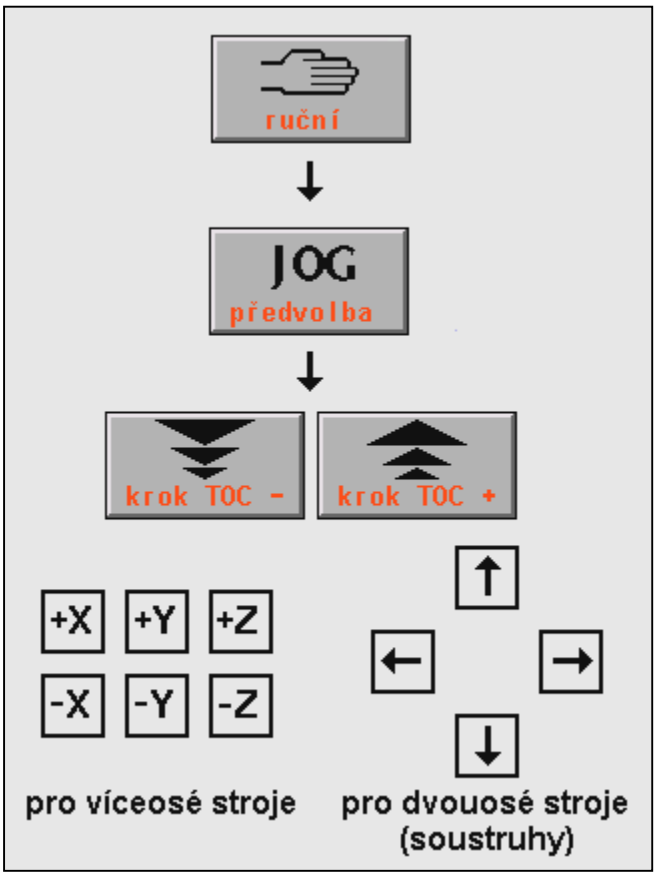
- system has the external panel with the knobs (from the MEFI company) connected as a serial periphery into the panel (machine constant 53, fourth decade = 1, machine constant 96, eighth decade = 0).
- the system has an independent knob connected into the co-ordinate control board (machine constant 53, fourth decade = 0, machine constant 96, eighth decade = 1).

The co-ordinate selection is performed by pressing down of one of the push-button s of the co-ordinates X. Y. Z etc. The co-ordinate selected is emphasized in the frame. By selection of the co-ordinate, the knob pulses start to be sensed by which the selected co-ordinate is controlled. The co-ordinate follows the direction of the knob rotation. It is possible to continue the movement control of the previously selected co-ordinate by the knob or it is possible to select any other axis for the movement controlled by the knob by means of the axis knob. In the menu it is possible to set the knob "step".

Note:
By pressing down the push-button s with the name of the co-ordinate and then pressing down the knobs + or – it is possible to control the travels by push-button s immediately. The travel controlled by the knob and push-button s may be combined arbitrarily.

8.3. JOG+ and JOG- modes

JOG (jogging) is the travel in the selected axis by the pre-selected path (1, 2, 5, 10. 20, 50, 100, 200, 500 microns and 1, 2, 5, 10. 20, 50, 100, 200, 500 mm) in positive or negative direction.



From the main MENU the selection is to be performed as follows:

Press the RUČNÝ push-button ant then the PRESELECTION push-button (JOG).

By means of push-button menu "TOC- step" and "TOC+ step" (with the multi-axis machines also by means of the cursor arrows) the path shall be pre-selected by which the co-ordinates shall be displaced.

Indication of the pre-selected path.

By pressing down the +X push-button or – X push-button the movement in the X co-ordinate in the positive or negative direction by pre-selected path may be started. Similarly, other co-ordinates

may be started. With the lathes the movement by pre-selected path will be started by pressing down the cursor arrow for the relevant direction.

Ruční – manual
předvolba = pre-selection
krok = step
pro víceosé stroje = for multi-axis machines
pro dvouosé stroje = for two-axis machines
soutruhy = lathes

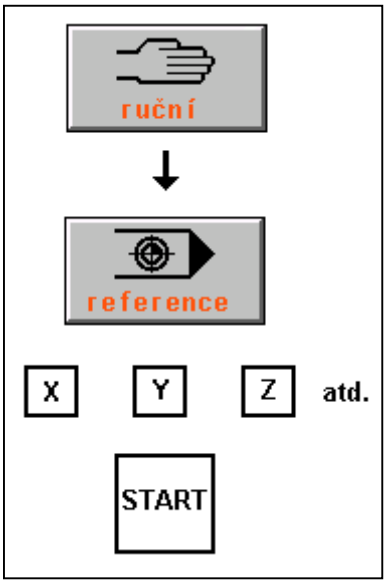
When the JOG mode is interrupted by the STOP push-button before finishing the movement, the whole pre-selected path will be run by repeated pressing down of the movement start. If the movement is not finished (the diode FUNCTION NOT FULFILLED is ON) and the conversion into any other mode is wanted, it is possible to perform the central cancellation.

Warning:
The co-ordinates in the JOG mode are moved by the velocity which was selected for manual modes. In the JOG mode it is not possible to control the feed by the %F potentiometer because it is necessary to checkup before JOG mode selection if the %F value is not equal to zero. If started the JOG mode with zero override by a mistake, it is necessary to stop it by the STOP push-button and then the central cancellation shall be started (to cancel the "FUNCTION NOT FULFILLED"), to set the non-zero override and the JOG mode shall be selected again.

8.6. REFERENCE mode
This mode has to be selected as the first one after the system turning on. It performs the run of the individual co-ordinates into initial reference positions. Reaching the reference is performed by the rapid feed in every of co-ordinates separately. After reaching of the decelerating reference switch (ZRS) the velocity is reduced and the signal from the reference switch is awaited. The run velocity by the rapid feed may be reduced in every time, even during the movement, by the %F potentiometer. The velocity of the rapid feed of the reference reaching may be also limited by setting of the machine constants 10 – 15 (see the Description of the Machine Constants).

Before reaching the reference, it is recommended to check up visually if no co-ordinate is situated on the deceleration reference switch. If it is the case, leave the switch e. g. in the MAN mode and then perform the reference reaching. If the co-ordinate "stays" on the deceleration switch, it is not guaranteed thar the zero pulse from the measuring sensor which determined the reference position, is the first one after reaching the deceleration reference switch.
So the incorrect reference position could be used.

8.6.1. Reaching the reference



From the main menu, the selection is performed by the following procedure:

Press down the manual mode push-button "ručně".

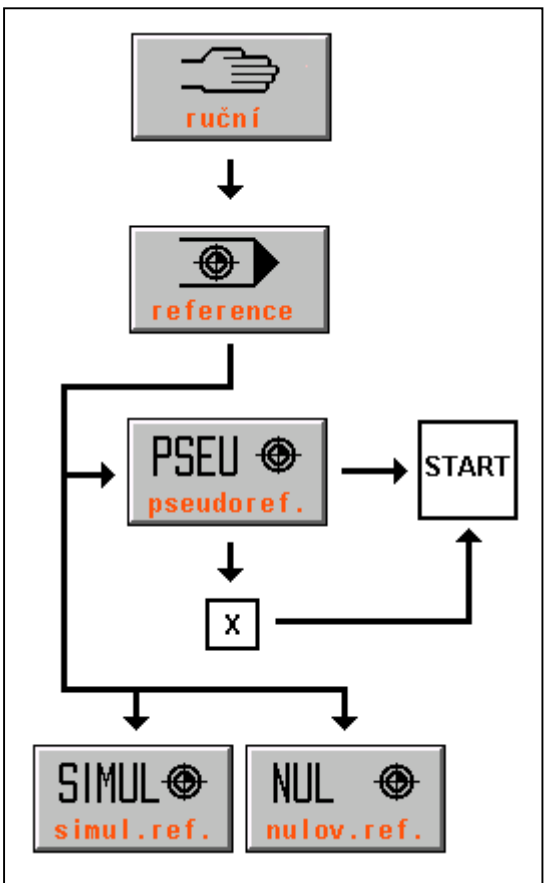
The co-ordinate is selected by pressing down of the push-button with its name (X, Y, Z etc. Regardless to a sing).

By pressing down the START push-button the selected co-ordinate runs into the reference position.
The travel direction into the reference for every of the axes is determined by machine constants 0 – 5 (see the file TAB0.REK).

Ruční = manual
Reference = reference
atd. = etc.

8.6.2. PSEUDOREFERENCE and REFERENCE SIMULATION

Beside reaching the reference it is possible to set the zero co-ordinate position in any arbitrary place, so-called pseudo-reference.



In the MENU window, three possibilities are offered to control the pseudo-reference.

PSEUDOREFERENCE. After pressing down of the push-button , all co-ordinates are selected (are appeared in the frame). After pressing down the START push-button all co-ordinates are set to zero..

If selected one co-ordinate, e. g. X (by pressing down of the X push-button , after doing it the co-ordinate will appear in the frame) this co-ordinate will be set only after pressing down the START push-button .

SIMULATION. After pressing down of this push-button the status "co-ordinates are in the reference" will be simulated. In the MODE window, in the reference frame, all co-ordinates

will be emphasized. The position remains unchanged.

RESET. After pressing down of this push-button the status “co-ordinates are not in the reference ” will be set. In the MODE window, in the reference frame, all co-ordinates will not be emphasized. The position remains unchanged.

Note:
Usage of the pseudo-reference with the machines where the classical reference switches are situated, it is not recommended to prevent from the accidental cancellation of the position. This possibility may be locked in the machine constants No. 0 up to 5 for each axis