

Control pod

FRECON MINITERMINAL FIA-L



INSTALLATION AND USER MANUAL

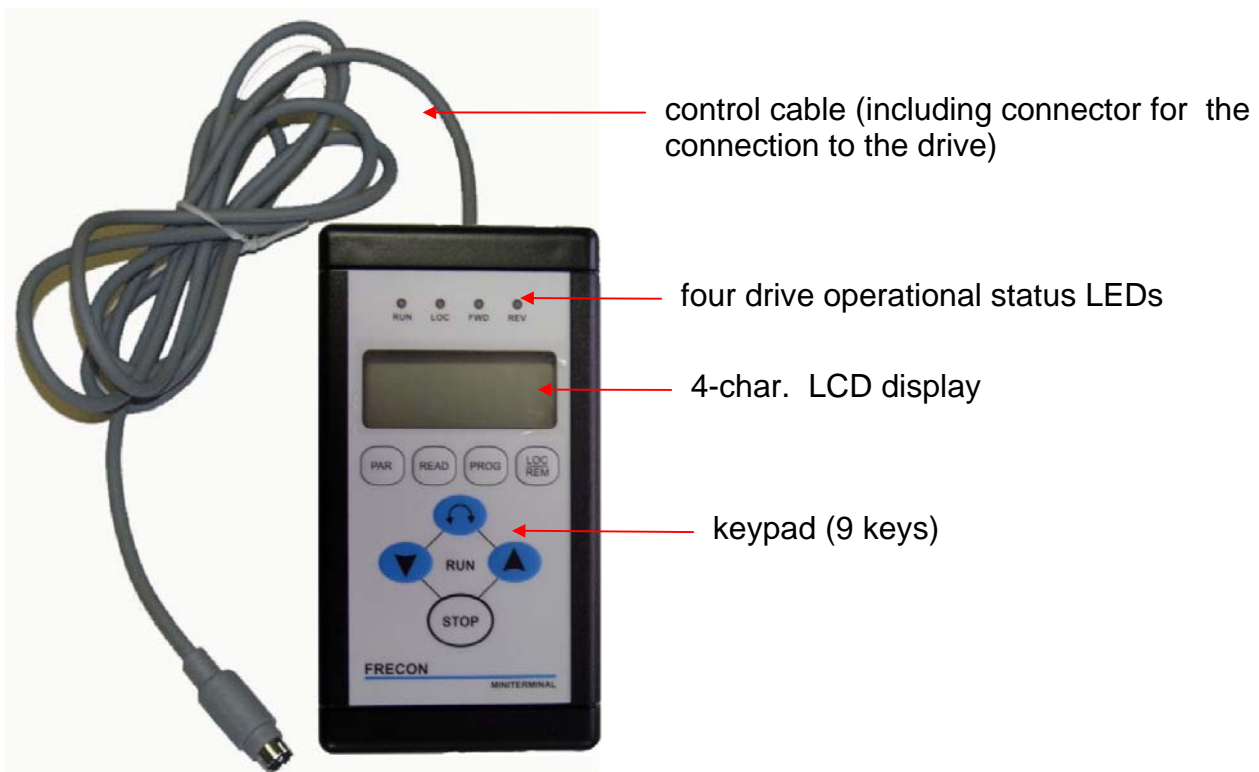


1. Introduction

FRECON MINITERMINAL - control pod for the FIA-L programmable speed drives combines keypad and display functions :

- local/remote control selection
- local control (run/stop, forward/reverse, output frequency control resolution : 0,01Hz)
- drive parameter values adjustment and display (LCD screen)
- user sets programming possibility (i.e. storing all functional parameters into EEPROM for automatic or manual restore)
- frequency reference and actual output frequency monitoring (LCD screen)
- operational status LED indication : run, fwd, rev, local control
- fault codes signalization
- MOUNTING : externally anywhere convenient at a distance permitted by maximum cable length of 6m between the drive and the pod.

2. General description



3. Connection to the drive

The pod is equipped by a standard control cable terminated by male connector suited for connection to the female connector of the drive. The standard cable length is 1m, the optional maximum length is 6m.

4. Operational status indication

Four red LEDs above the keypad indicate the status of the drive.

RUN
○
○ - indicates status "RUN" or "STOP", i.e. the activation of the output power bridge
light on : the output power bridge is active (status "RUN")
light off : the output power bridge is inactive (status "STOP")

LOC
○
○ - indicates actual control mode
light on : local (keypad) control mode
light off : remote (terminals) control mode

FWD REV
○ ○ - FWD, REV indicate the actual and required direction of motor rotation
light on : the actual direction
light flashing : the required but not actual direction of rotation (light of the actual direction remains on)

5. Functional keypad description

5.1. Parameters setting keys

Parameters and their values are adjusted by the three keys :



The keys UP/DOWN enable :

- selection of parameter code from parameter menu
- parameter value changing
- speed control in local (keypad) control mode

NOTE :
- a single keystroke changes the value step by step, depending on displayed value resolution
- press and hold the key for faster fluent changes



The key "PAR" switches between menu-code and actual value of the selected parameter. Press the "PAR" key to switch to parameter menu. The display will show the actual parameter code.

Shift in menu using UP/ DOWN keys to see the menu-code of selected parameter.

Press the "PAR" key to display the actual value of selected parameter.

Using UP/DOWN keys change the active parameter setting to required value.

To resume another parameter adjustment, press the "PAR" key again to return to menu.

5.2. Control mode selection key



Two modes are available :

- local (keypad) control
indication LOC : light on
- remote control; without using keypad
indication LOC : light off

NOTE : - During initialization after energising the drive, the remote control mode is automatically selected as the active control mode.
- When switching from the remote control mode to the local control mode, the operational status command of the drive determined by previous remote control (run/stop, direction of rotation and frequency reference value FSET) is unchanged and used as current operational status command for the local control.
- The key can be used at any operational status of the drive.

5.3. Parameter sets manipulation keys



operating parameters storing into the user set

Press the PROG key to store the actual values of all parameters from working area (memory RAM) into the required user set (memory EEPROM). Data in EEPROM are not lost when power is disconnected from. The PROG procedure requires the motor to be stopped (output of the drive is inactive), and the display to show the selected set code (parameter SET).

If these conditions are not fulfilled, the display will show the corresponding fault code.
(refer to chapter 9. Parameter sets manipulation)



operating parameters reading from the set into the working area

Press the READ key to read the values of all parameters from selected user set (memory EEPROM) or factory set (memory ROM) into the working area.

The READ procedure requires the motor to be stopped (output of the drive is inactive), and the display to show the selected set code (value of parameter SET).

It is also assumed that the selected set is not blank and the stored data are compatible with the software of the drive.

If any of the previous conditions isn't fulfilled, the corresponding fault code is displayed.
(Refer to chapter 9. Parameter sets manipulation)

5.4. Local control keys



F/R rotation direction switching (local control)

During local control the keystroke on F/R switches the required direction of rotation.

When the drive is stopped, only the indication of preselected direction (LED-diodes FWD,REV) is switched to opposite direction.

When the drive is running, the keystroke on F/R will cause fluent change of the rotation direction. First the frequency decreases down (deceleration is driven by parameter DEC), the original direction indicator lights and the new required direction indicator flashes. After crossing zero value the output frequency increases up to required value in opposite direction (the acceleration is driven by parameter ACC), the original direction indicator is set off and the new actual direction indicator lights.

In the remote control mode the F/R key is ignored.

RUN**command RUN - start of the drive (local control)**

When the drive is stopped (indicator RUN is off) and local control is selected (indicator LOC lights), the keystroke on RUN causes the drive to start rotation in selected direction (indicators FWD/REV). The output frequency increases from zero up to required frequency, which is set by the value of frequency reference FSET. The acceleration is driven by parameter ACC. (Note: Pressing UP or DOWN key during acceleration causes immediate stopping of acceleration as the value of frequency reference FSET is overwritten by the value of current output frequency.)

In the remote control mode the RUN key is ignored.

STOP**command STOP - stop of the drive (local control)**

In the local mode the keystroke on STOP causes stopping of the drive and deactivation of the 3-phase output of the inverter. The way of running down is selected by parameter CSTOP:

- CSTOP = 0 - ramp mode (controlled run down), i.e. after command STOP the output frequency decreases down to zero with deceleration driven by parameter DEC. After reaching zero frequency the drive is still braked for about 30 ms by DC voltage, value of which is set by parameter U0. Then the output of inverter is deactivated.
- CSTOP = 1 - coast to stop mode (free run down), i.e. immediately after command STOP the output of inverter is deactivated and the motor runs down freely. The running down time depends on the moment of inertia of connected motor and load.

In the remote mode the STOP key is ignored.

6. Control modes

6.1. REMOTE CONTROL (terminals)

In the remote control mode the drive is operated by control signals connected to terminals. One analogue control signal (voltage 0-10V / 2-10V, current 0-20mA / 4-20mA, or potentiometer) and two digital control signals RUN/STOP and FWD/REV are used. The analogue signal controls the output frequency, i.e. the speed of the drive. The digital signals control start, stop and direction of rotation of the drive. The analogue signal - to - output frequency reference conversion is determined by parameters F0, F100 and CINP.

These signals can be controlled by a control system, PLC, FRECON TELECONTROL, or any other way. If a miniterminal is connected to a drive, the local control keys are ignored, when the remote control mode is selected.

6.2. LOCAL CONTROL (keypad)

In the local control mode the drive is fully operated by the control pod FRECON MINITERMINAL. The local control keys enable to start and to stop the drive, to change the direction of rotation, to set the output frequency reference FSET, or to control directly the actual output frequency FOUT in the full range 0-125 Hz with 0.01 Hz resolution, independently on the setting of parameters F0, F100 and CINP.

One single keystroke on UP/DOWN keys changes the value of FSET or FOUT by one step, i.e. 0.01 Hz, longer pressing causes faster continuous changing of the value.

In the local control mode the remote control signals from terminals are ignored.

7. Displayable values and adjustable drive parameters table

menu code	display/setting range	unit	short description
Actual and required output frequency			
FOUT	0.00 - 125.0	Hz	actual output frequency
FSET	0.00 - 125.0	Hz	required output frequency (reference value)
Analogue control signal to output frequency reference FSET conversion parameters (Output frequency limit values for remote control)			
F0	0.0 - 125.0	Hz	req.frequency for 0% analogue signal
F100	0.0 - 125.0	Hz	req.frequency for 100% analogue signal
Substitutional output frequency for invalid analogue signal (only for CINP=3)			
FERR	0.0 - 125.0	Hz	substitutional frequency reference
Dynamic parameters			
ACC	0.5 - 500.0	Hz/s	max. acceleration of output frequency
DEC	0.5 - 500.0	Hz/s	max. deceleration of output frequency
V/f characteristic			
FBAS	25.0 - 241.0	Hz	base (nominal) frequency (max.voltage reached)
U0	0.0 - 22.0	% V_{MAX}	output voltage for FOUT=0 Hz
U1	1.0 - 30.0	% V_{MAX}	output voltage for FOUT= 1/8 FBAS
U2	2.0 - 40.0	% V_{MAX}	output voltage for FOUT= 2/8 FBAS
U3	4.0 - 50.0	% V_{MAX}	output voltage for FOUT= 3/8 FBAS
U4	6.0 - 60.0	% V_{MAX}	output voltage for FOUT= 4/8 FBAS
U5	10.0 - 70.0	% V_{MAX}	output voltage for FOUT= 5/8 FBAS
U6	16.0 - 81.0	% V_{MAX}	output voltage for FOUT= 6/8 FBAS
U7	32.0 - 93.0	% V_{MAX}	output voltage for FOUT= 7/8 FBAS
Configuration parameters			
CINP	0,1,2,3	-	input analogue signal selection
CSTP	0, 1	-	running down mode selection
CRTR	0, 1	-	enable user RESET selection
Auxiliary parameter for parameter sets handling			
SET	UI-0,...,FA-3	-	parameter set identification

NOTE : The collection of parameters listed in table (except parameters FOUT, FSET, SET) forms the „functional parameter set“. The significance of functional parameter sets is described in chapter 9. Parameter sets manipulation.

8. Detailed description of displayable values and adjustable drive parameters

8.1. Actual and required output frequency

FOUT - actual output frequency value
- display / setting range : 0.00 - 125.0 Hz

When the drive runs the actual output frequency FOUT follows the value of frequency reference FSET considering acceleration/deceleration limits ACC/DEC.

In the remote control mode the frequency reference FSET, and consequently the output frequency, are limited by values F0 and F100. The only exception is possible when the substitutional output frequency reference FERR outside the limits F0, F100 is used (refer to description of parameters F0, F100, FERR and CINP).

In the local control mode the actual output frequency can be changed by UP/DOWN keys in the whole range 0.00-125.0 Hz.

When the drive is stopped, the code „rdy“ is displayed, instead of zero value, indicating that the drive is stopped but ready to run.

Flashing code „-rdy“ indicates that in stop state, remote control selected and CINP=2(3), an invalid analogue control signal (decreased under 2.5mA or 1.3V) is being recognized. In this case the command „RUN“ will cause:

- for CINP=2 - immediate shut-down of the inverter output with error code „Er.01“ signalization
- for CINP=3 - running up the drive with the substitutional output frequency reference set by parameter FERR

Flashing FOUT value indicates that the drive is running using the substitutional frequency reference. Refer to description of parameters FERR and CINP.

FSET - required output frequency (i.e. frequency reference) value
- display / setting range : 0.00 - 125.0 Hz

In the remote control mode the value of FSET is driven by input analogue control signal according to setting of parameters F0, F100 and CINP.

The FSET value can be monitored also during stop state, when the output frequency is zero and the output of inverter is not active.

Flashing FSET value („0.00“ for CINP=2 or „<FERR>“ for CINP=3) indicates an invalid input analogue control signal.

In the local control mode the value of FSET can be changed (controlled) only by UP/DOWN keys, and in the whole range 0.00-125.0 Hz.

8.2. Analogue signal - to - frequency reference conversion parameters (limit values of output frequency for remote control)

F0- required output frequency related to input analogue signal of 0% of the selected range, i.e. 0V / 0mA for CINP=1,2 or 2V / 4mA for CINP=3,4

F100 - required output frequency related to input analogue signal of 100% of the selected range, i.e. 10V / 20mA for all settings of parameter CINP
- setting range : 0.00 - 125.0 Hz

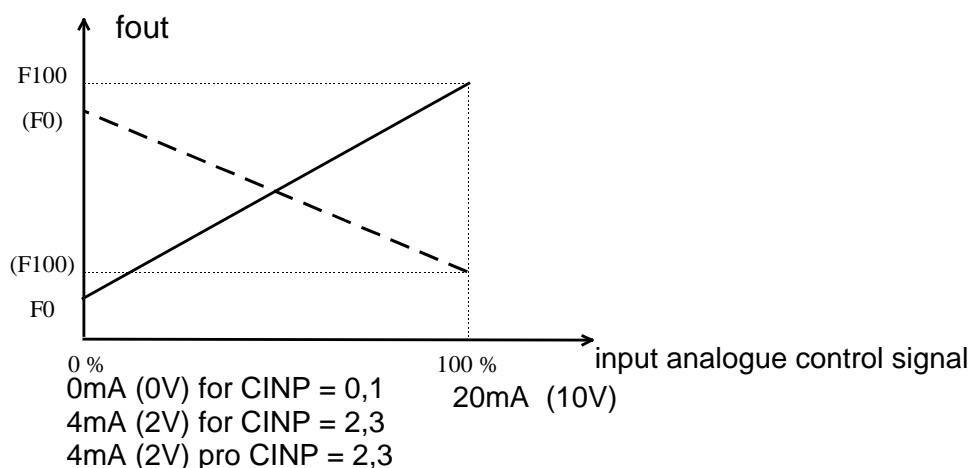
The parameters F0 and F100 determine the linear conversion from input analogue control signal to output frequency reference and consequently the limit values of output frequency when the remote control mode is selected.

F0 < F100 - standard rising linear conversion characteristic, where higher input signal determines higher output frequency, F0 determines minimum and F100 maximum output frequency in the remote control mode

F0 > F100 - falling linear conversion characteristic, where higher input signal determines lower output frequency, F100 determines minimum and F0 maximum output frequency in the remote control mode

The 100% value is represented by 20mA / 10V of current / voltage input signal.

The 0% value is represented by 0mA / 10V for CINP=1,2 or by 4mA / 2V for CINP=2,3.



WARNING !

When using the possibility of substitutional output frequency FERR by setting CINP=3, it should be considered that the value FERR isn't limited by F0 and F100. Therefore, if an invalid input signal was recognised and the substitutional value FERR is used as a frequency reference, the output frequency can be out of the interval limited by values F0 and F100.

8.3. Substitutional output frequency reference (remote control)

FERR - substitutional output frequency reference
- setting range : 0.00 - 125.0 Hz

The parameter FERR is meaningful only if CINP=3 in the remote control mode. In this case the value of FERR is used as the substitutional frequency reference, when an invalid value of input analogue signal was recognised. It should be considered that the value of FERR, and consequently the value of substitutional output frequency, are not limited by parameters F0 and F100.

8.4. Dynamic parameters

ACC - maximum acceleration of output frequency in Hz/s

DEC - maximum deceleration of output frequency in Hz/s
- setting range: 0.5 - 500.0 Hz/s

Parameters ACC/DEC limit the output frequency acceleration/deceleration, and consequently they determine the run up/down times.

Excessively high value of ACC, related to the driven load, could involve an inefficient start up of a drive, heat stress of a motor, overcurrent and shut-down of the inverter.

Excessively high value of DEC, related to connected moment of inertia, could involve the overvoltage shut-down of the inverter.

8.5. V/f characteristic

FBAS - base frequency
 - setting range : 25.0 - 241.0 Hz

Parameter FBAS determines the maximum voltage reaching frequency, and consequently the constant ratio V/f, flux, and available torque for frequencies under FBAS, if a compensated linear V/f characteristic is set. For frequencies above FBAS, the output voltage remains constant (available maximum voltage), and consequently the magnetic flux and available motor torque decrease („field weakening“).

The „nominal“ setting of FBAS according to nominal (labeled) motor data:

$$FBAS = F_n * V_{MAX} / V_n \quad , \text{ where}$$

F_n is the nominal motor frequency - usually 50 or 60 Hz

V_n is the nominal motor voltage - usually 400/230 V (motor windings connection should be considered or rearranged for desired value of FBAS)

V_{MAX} is the maximum available output voltage of the inverter, for FIA-L inverters this voltage is equal to the supply voltage, i.e. $V_{MAX} = 230$ V

The calculation example for a common motor with delta windings connection ($V_n = 3 \times 230$ V, $F_n = 50$ Hz):

$$FBAS = 50 * 230 / 230 = 50 \text{ Hz}$$

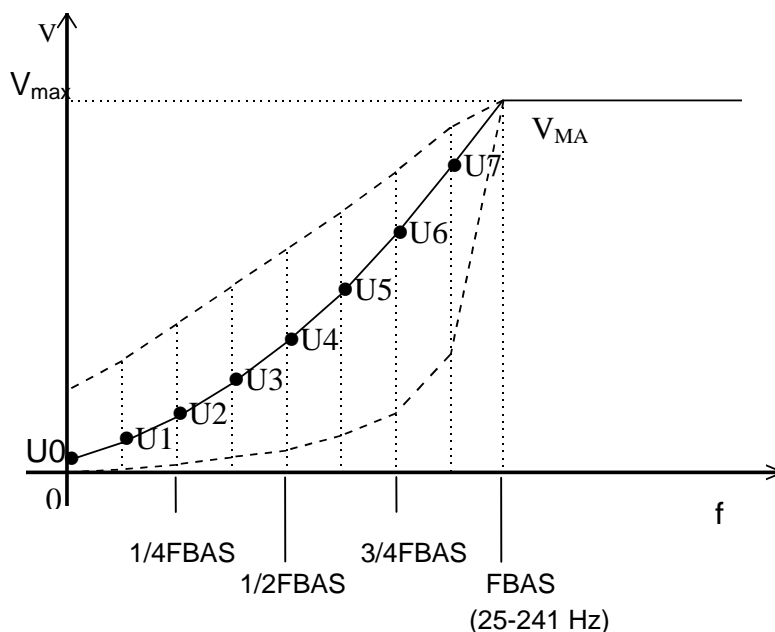
Setting FBAS above the nominal value, using the same load, involves decreasing of the magnetic flux and available motor torque, the drive is „softer“, and the slip rises. Setting FBAS above its nominal value could be recommended only when the motor is loaded by a soft load lower then the nominal motor load.

Setting FBAS under the nominal value enables partially to increase available motor torque, however, the danger of magnetic saturation, overcurrent, high losses and motor overheating damage rises. Setting FBAS under the nominal value isn't recommended.

U0, U1, ... , U7 - V/f characteristic curve

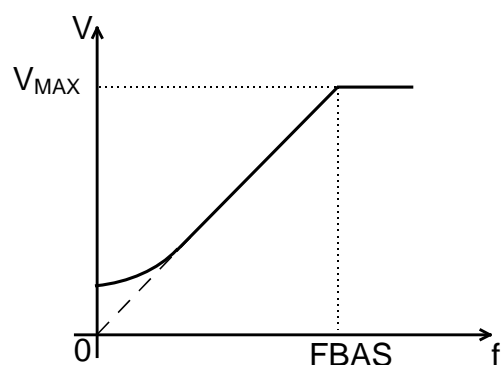
- the values U0, U1, ..., U7 are set and displayed as percentage values related to V_{max} , and they determine the output voltages for output frequencies 0, 1/8, 2/8, ..., 7/8 FBAS
- setting ranges are listed in the parameters table, and graphically represented in the following figure.

Voltage values U0-U7 determine the V/f characteristic curve for output frequencies under FBAS. Together with FBAS, they allow to adjust the V/f characteristic for various motors and driven loads.

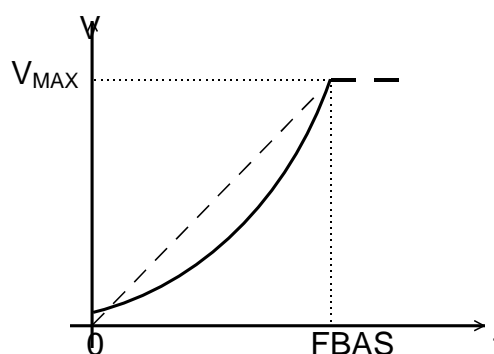


When the constant available motor torque at reduced speed is required, the linear V/f curve should be used with increased voltage at low frequencies (under 1/2 FBAS) to compensate the voltage drop in motor windings. Voltage level at very low frequencies should be set as a compromise of the required torque and the danger of overheating the motor due to decreased efficiency of the motor selfcooling. When U_0 is set above approximately 8-12 % V_{MAX} (depending on motor type and power) and the motor is continuously operated at low frequencies, a speed independent forced ventilation should be used.

Many loads do not need the constant torque at reduced speed, for example fans, blowers and pumps. In this cases a nonlinear V/f curve with reduced voltage is more efficient, since the motor power-factor increases, the wattless current decreases, the motor is free of overheat stresses, and the efficiency of the whole drive increases.



Linear V/f curve



Fan V/f curve

8.6. Configuration parameters

CINP - determination of input analogue control signal for remote control
(setting of CINP doesn't affect local control)

- **CINP = 0** 0 - 20 mA (0 - 10 V) standard
- **CINP = 1** 0 - 20 mA (0 - 10 V) with analogue signal controlled STOP
When the input analogue signal is driven down under 1mA (0.5V), the run down and stop of the drive is realised. This enables (for one-direction operation and permanently activated input RUN/STOP) to operate the drive by the only one (analogue) signal or potentiometer (like a potentiometer with OFF position).
- **CINP = 2** 4 - 20 mA (2 - 10 V) with drive shut-down if an invalid input signal is recognised
When an invalid input analogue control signal is recognised (under 2.5mA or 1.3V), the drive is immediately shut down, the output status relay signalizes the fault state, and the corresponding error code is displayed.
- **CINP = 3** 4 - 20 mA (2 - 10 V) with constant substitutional frequency if an invalid signal is recognised
When an invalid input analogue signal is recognised, the value of FERR is used as the constant substitutional frequency reference.

CSTP - run down mode selection for STOP command

- **CSTP = 0** ramp mode (controlled run down)
After command STOP, the output frequency continuously decreases with the constant deceleration set by parameter DEC. After reaching the zero frequency, the drive is still dc braked for about 30ms, and then the output of inverter is deactivated.
- **CSTP = 1** coast to stop mode (free run down)
Immediately after the command STOP, the output of inverter is deactivated and the drive runs down freely.

CRTR - RESET mode selection (determines the possibility of resetting the drive after shut down with or without the necessity of switching off the power supply)

- **CRTR = 0** Switching off the power supply for several seconds is the only way to reset the drive after shut down.
- **CRTR = 1** The reset of the drive after shut down can be realised without switching off the power supply :
 - a) by pressing STOP key on keypad in local control mode
 - b) by leading edge of STOP signal (i.e. trailing edge of RUN signal) in remote control mode

Notes: 1) As the LOC/REM key is not locked, when the drive is shut down, the reset of the drive after shut down during remote control can be realised also locally by switching to local control using the LOC/REM key, resetting the inverter using the STOP key, and switching back (after the „rdy“ code is signaled) to remote control. However, it is always necessary to find out and remove the failure reason.

2) When the reset of a drive without switching off the power supply is performed, the working parameters keep their values as they were before the reset operation. When switching off and on the power supply, the working parameters are reinitialised, i.e. reloaded from the basic user set UI-0, which has been programmed by user into EEPROM.

WARNING : The restart of a drive (i.e. the reactivation of the RUN command) should be realised after the mechanical stop of the motor to avoid overvoltage / overcurrent stresses when a low frequency is forced to a running motor.

8.7. Auxiliary parameter for parameter sets identification

SET - parameter set identification

UI-0, UI-1, UI-2, UI-3 - internal user sets of parameters (located in the EEPROM inside the inverter)

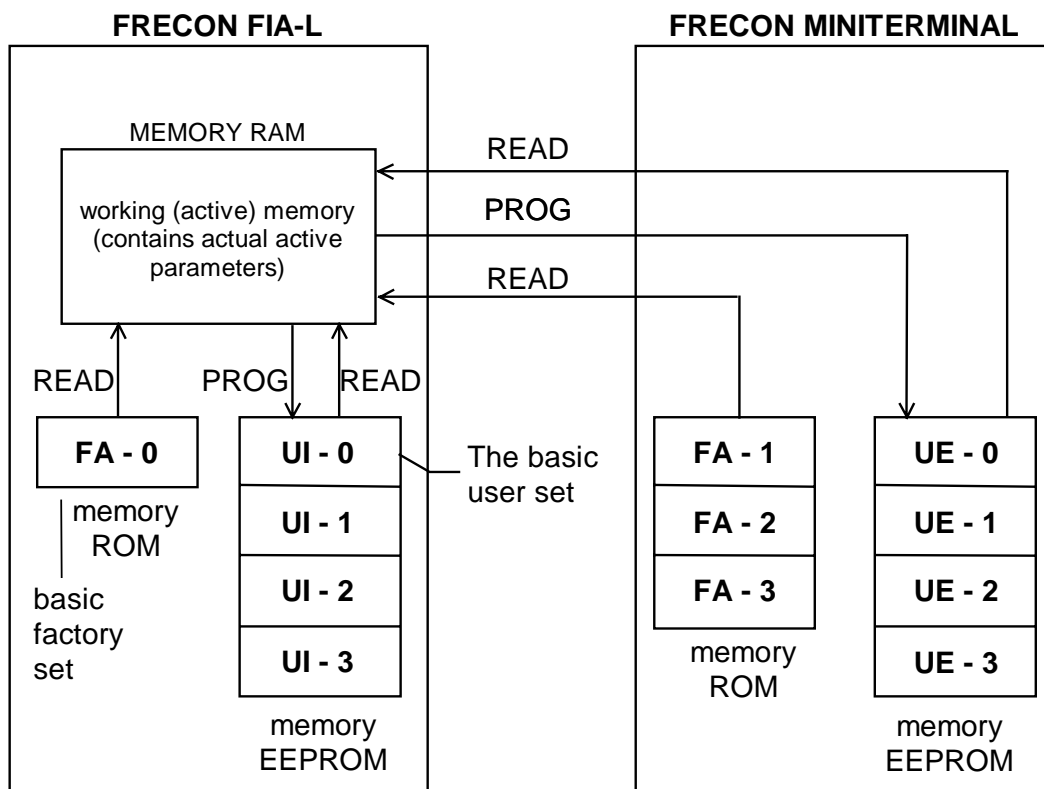
UE-0, UE-1, UE-2, UE-3 - external user sets of parameters (located in the EEPROM inside the FRECON MINITERMINAL control pod, so they enable to transfer sets of parameters from one inverter to another one)

FA-0, FA-1, FA-2, FA-3 - factory sets of parameters (located in ROM, not reprogrammable by user), they contain the most frequently used settings of parameters to help a user with tuning the drive for common use.

See also the next chapter.

9. Parameter sets manipulation

Parameter sets memory locations and possibilities of data transfer are drawn in the following figure :



Active set

The active set is located in the working (active) memory RAM inside the inverter. The active set has no identification and contains all active functional parameters. The values of active parameters can be displayed and adjusted using the FRECON MINITERMINAL control pod. All active parameters changes can be realised even during motor running with immediate response in function.

User sets

The contents of the active set (i.e. the active adjustment of all functional parameters) can be stored (programmed) into any user set, which preserves stored data, when the power supply is switched off (EEPROM memory). The basic user set, identified as UI-0, is the most important set as it determines initial setting of active parameters after energising the inverter.

Storing (programming) the active set to a selected user set

Stop the drive. Using keys PAR,UP,DOWN select parameter SET from menu, display and set its value to show the selected user set identifier. Then press the PROG key. During programming, which takes approximately two seconds, the display shows the programming function symbol „Pr“ with rotating segment on the right side. The contents of active set are not affected by PROG, the old contents of the overprogrammed user set are lost.

Loading (reading) the contents of selected user set into the active set

Stop the drive, display the SET parameter and adjust it to show the identifier of the selected user set. Then press the READ key. During loading, the symbol „rd“ with rotating segment on the right side is displayed. The old contents of active parameters are lost, the contents of the source user set are not affected by READ operation.

Parameter set transfer from one inverter to the other one

As an example, the copy of the basic internal user set **UI-0** from the source inverter to the basic internal user sets **UI-0** of two other destination inverters is described in the following steps :

- a) connect the control pod FRECON MINITERMINAL to the source inverter
- b) load (READ) the user set **UI-0** into the working area (active set)
- c) store (PROG) the active set into any external user set, for example into **UE-0** (the copied set is now stored in EEPROM inside the control pod)
- d) disconnect the control pod from the source inverter and connect it to one of the destination inverters
- e) load (READ) the external user set **UE-0** into the working area (active set)
- f) store (PROG) the active set into the destination internal user set **UI-0**
- g) connect the control pod to the second destination inverter and repeat steps e) and f).

Factory sets

Factory sets contain the most common preset values of all functional parameters. The user can use them or not. Any factory set can be loaded into the working area as active set, there it can be eventually modified and stored into any user set. Factory sets cannot be overprogrammed.

The basic factory set **FA-0** contains the most frequently used setting of functional parameters for the most common drives and loads with linear V/f characteristic. The factory set **FA-1** contains the most frequently used setting of functional parameters for the most common fans.

Initial setting of the active parameters in the working area

During the initialisation after the inverter is powered on, the data from the basic internal user set **UI-0** are automatically loaded into the working area as active parameters, independently on whether the control pod is connected or not. This enables the user to preset the initial setting of the drive.

If the user set **UI-0** is empty (not yet programmed), the contents of the basic factory set **FA-0** are automatically loaded instead of UI-0 during the initialisation.

10. Software compatibility

Since several versions of FIA-L control program has been already developed (standard drives, high speed drives with output frequency up to 500Hz, drives with integrated PI-regulators of speed dependent technological variables, etc.) and new and higher software versions can occur in future, the two-level software compatibility checking is used:

• Software compatibility of an inverter and the connected control pod

This incompatibility is found out immediately after connecting the control pod to the inverter as the error message „**Er.03**“ is signaled on the display. This control pod cannot operate with this inverter.

• Compatibility of the control program and the parameter sets data format

The incompatible data format is found out when the user is trying to load the incompatible parameter set into the working area. This failure is signaled by error message „**Er.18**“ which indicates unusable data. This parameter set can be assumed as an empty set.

11. Failures signalization

When an operational failure or a parameter set manipulation error occurs, the corresponding error code is signalized on the display as a flashing message „Er.NN“, where NN is the numeric error identifier.

11.1. Operational failures

- Er.00** - internal protection inverter shut-down
cause: short circuit, overcurrent, Ixt, overvoltage, undervoltage, damaged motor, motor or power supply connection failure, motor windings connection failure
solution: Find out the cause, clear the fault, restart the drive.
Note: A strong interference source near the inverter can cause an accidental shut-down of the inverter. In this case the interference source should be removed, eliminated or suppressed using electromagnetic screen, noise suppressor or any other suitable interference suppressor or combination of them.
- Er.01** - inverter shut-down caused by an invalid input analogue signal during remote control
cause: The invalid input signal or incorrect parameter C1NP setting
solution: Find out the cause, clear the fault, restart the drive.
- Er.02** - communication error between inverter and control pod
cause: Connection failure, too long cable, strong interference near the cable
solution: Quit the failure signalization by pressing any of the keys UP, DOWN, PAR. If the communication failure repeats, check the cable and its connection to the drive. If the failure still repeats, try to find out and eliminate the interference source, or reduce the cable length.
- Er.03** - software incompatibility
cause: The software versions of the inverter and control pod are incompatible
solution: set the control pod with a compatible software version.

11.2. Parameter sets manipulation errors

- Er.10 - Er.17** - EEPROM read/write failure
cause: Accidental or repeated hardware failure
solution: If the failure occurs accidentally, you can quit the signalization by pressing any of the keys PAR, UP, DOWN, STOP. If not accidental, the hardware failure requires the service repairation.
WARNING ! If this failure occurs during READ operation (loading the working area), it is necessary to repeat the READ operation as the working area may contain incorrect data. The RUN command must not be executed before correct data has been loaded into the working area.
- Er.18** - unusable data in the selected parameter set
cause: The set is empty (not yet programmed) or incompatible data format was recognized (such set can be also assumed as an empty set)
solution: Quit the signalization and load (READ) another parameter set.

- Er.19** - checksum error of the loaded parameter set
WARNING! New data from the selected parameter set were loaded into the working area, however they shouldn't be used as they could contain incorrect data.
solution: Quit the signalization and repeat the READ operation. If the failure occurs again, read another parameter set.
- Er.20** - the drive was running when the command READ/PROG was entered
solution: Quit the signalization, stop the drive, and repeat the READ/PROG command.
- Er.21** - the identifier of the selected parameter set must be displayed when the READ/PROG command is being entered.
solution: Quit the signalization, select the parameter SET from menu, display and set its value to the desired parameter set identifier, and repeat the READ/PROG command.
- Er.22** - It is impossible to overprogram a factory set.

- Notes :**
- 1) When the failure **Er.00** or **Er.01** occurs, the immediate automatic shut-down of the inverter is realised and the motor runs freely down. Available ways of resetting the drive depend on the parameter CRTR setting.
 - 2) During the signalization of **Er.00** or **Er.01**, all the keys are locked (ignored), except the LOC/REM key. If CRTR=1 and local control is switch on, the key STOP is also unlocked to enable the local RESET operation (refer to description of the parameter CRTR).
 - 3) During all other failure signalizations, the only unlocked keys are UP, DOWN, PAR and STOP. Pressing any of them quits the failure signalization. During local control, the STOP key in addition stops the drive.