Quick guide to configure a constant pressure application with Sleep Mode functionality

The following guide reports all the necessary settings to configure a constant pressure system by means a VLT Micro Drive FC51 and a two wires 4-20 mA current transducer.

The system allows stopping the pump automatically when the pressure setpoint is reached and there is no water demand.

System Requirements:

Frequency Converter	*VLT Micro Drive FC 51*
Local Control Panel	Numerical Display
Pressure Transducer	Two wires 4 ÷ 20 mA (Ex. . MBS 33)
Free analog input for the transducer	Analog Input 60

Electrical Connections:
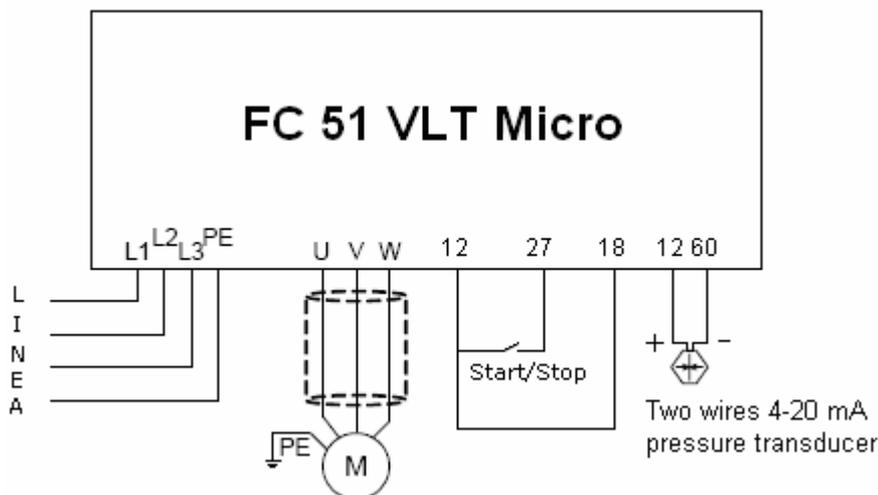
Programming:

Programming can be performed with a PC and a USB/RS 485 converter (Ex. Adam 4561) after the installation of the MCT 10 software that can be downloaded for free from the following link:

WWW.VLT-SOFTWARE.COM

Should the software not be available, you can always use the local control panel for programming.

The programming steps that we are going to describe are only valid if the drive starts from the factory settings (default).

In case of doubts or if the drive has been already configured for different applications, it is recommended to re-initialize the unit to factory settings with the following procedure:

1) Set the parameter 14-22 as "initialisation" [2]
2) Power off the drive and wait until the display is completely off
3) Power up the drive
4) Reset the alarm that informs you that the drive is initialized (Alarm 80) by pressing the [Off Reset] key
5) Turn off the local potentiometer on board of the display and press in sequence [Hand on] and [Auto on] to clear the alarm message

USB Cable

Data +   Data -

69   68
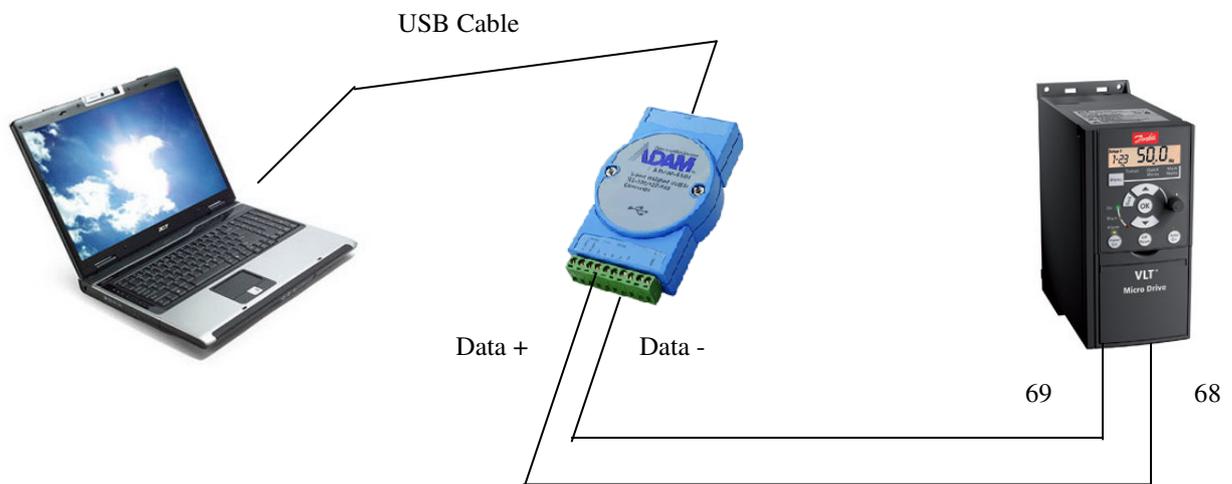
Parameters to be set starting from the factory settings:

☞ *It's very important to set the parameters following exactly the sequence as listed below*

Basic Parameters

Parameter N°	Description	Setting	Note
1-00	Configuration mode	Process [3]	Enables the PID controller
1-03	Torque characteristics	AEO [2]	Torque characteristic to be used for centrifugal pumps
1-05	Hand mode configuration	Speed open loop [0]	It allows the direct speed control when the drive is set to local mode by pressing the [Hand on] key
1-20	Motor power [Kw]	Example: 1,5 Kw	See motor plate
1-22	Motor voltage	Example: 400 V	See motor plate
1-23	Motor frequency	Example: 50 Hz	See motor plate
1-24	Motor current	Example: 3,8 A	See motor plate
1-25	Motor nominal speed	Example: 1420 rpm	See motor plate
1-62	Slip compensation	0 %	Turns off the slip compensation

Automatic Motor Adaptation (AMT)

The following step is not mandatory, but it helps to optimize the motor performance and compensates for the cable length.

N° Parametro	Descrizione	Impostazione	Note
1-29	AMT	Enable AMT [2]	Automatic detection of the advanced motor data

Once the parameter is set, the display will ask to press [Hand on] to start the AMT.

Press [Hand on] and wait for the measurement to be completed, note that this could last also for several minutes. – The motor won't spin!

Once completed, you will be asked to press [OK] to finish the AMT.

☞ *Under some circumstances, like for example in case of some submersible pumps, the AMT can't be completed (error indication or local display view *).*
Should this be the case, you can skip and proceed to the next steps

Operation range and PID controller

Parameter N°	Description	Setting	Note
3-03	Maximum reference	100 %	The operation range is set from 0 to 100%
3-10 [0]	Preset reference 0	Example: 50 %	Set the pressure value (in percentage) that must be kept constant (Setpoint)
3-15	Reference resource 1	No function [0]	Turns off the input 53 as reference
3-16	Reference resource 2	No function [0]	Turns off the input 60 as reference
3-41	Ramp up time	Example: 3 seconds	Don't set a value too high to allow a good PID control
3-42	Ramp down time	Example: 3 seconds	Don't set a value too high to allow a good PID control
4-12	Motor speed low limit	Example: 30 Hz	Set the minimum speed of the pump
4-14	Motor speed high limit	Example: 50 Hz	Set the maximum speed of the pump
5-12	Terminal 27 digital input	Stop inverse [6]	Assigns the start/stop function to the terminal 27
6-22	Terminal 60 low current	4 mA	Set the minimum value of the input 60 at 4 mA
6-25	Terminal 60 High feedback value	100 %	The operation range is set from 0 to 100% (same as the parameter 3-03)
7-20	Feedback 1 resource	Analog input 60 [2]	The current transducer signal is assigned to the terminal 60
7-32	Process PI start speed	Example: 30 Hz	Set a value equal or higher than the motor minimum speed set in the parameter 4-12
7-33	PID proportional gain	Example: 2	The higher this value, the faster will be the response time of the system and vice versa
7-34	PID integral time	Example: 8	The lower this value, the faster will be the response time of the system and vice versa

Sleep mode

Sleep mode functionality is achieved with the help of the logic sequencer that is embedded as standard into the drive (Smart Logic Controller)

Parameter N°	Description	Setting	Note
13-00	Smart logic controller	ON [1]	Enables the Smart Logic Controller
13-10 [0]	Comparator operand 0	Motor speed [3]	Motor speed is compared
13-10 [1]	Comparator operand 1	Feedback [2]	Feedback is compared
13-11 [0]	Comparator operator 0	Less than [0]	Comparator 0 is valid if the motor speed is lower than the value set in the parameter 13-12[0]
13-11 [1]	Comparator operator 1	Less than [0]	Comparator 1 is valid if the feedback is lower than the value set in the parameter 13-12[1]
13-12 [0]	Comparator value 0	Example: 32 Hz	Sleep mode will be activated when the speed is lower than this value and the time set in the parameter 13-20 [1] is elapsed. Must be set higher than the motor minimum speed, par. [4-12]
13-12 [1]	Comparator value 1	Example: 45 %	Set the pressure value in percentage: the system will wake up when the pressure falls below this value
13-20 [0]	Timer 0	15 Seconds	Minimum run time (do not modify)
13-20 [1]	Timer 1	Example: 20 Seconds	Delay time before entering the sleep mode

13-51 [0]	Event 0	Running [2]	Fixed value, not to be modified
13-51 [1]	Event 1	SL Time-out 0 [30]	Fixed value, not to be modified
13-51 [2]	Event 2	Comparator 0 [22]	Fixed value, not to be modified
13-51 [3]	Event 3	SL Timeout 1 [31]	Fixed value, not to be modified
13-51 [4]	Event 4	Comparator 1 [23]	Fixed value, not to be modified
13-52 [0]	Action 0	Start Timer 0 [29]	Fixed value, not to be modified
13-52 [1]	Action 1	No Action [1]	Fixed value, not to be modified
13-52 [2]	Action 2	Start Timer 1 [30]	Fixed value, not to be modified
13-52 [3]	Action 3	Stop [24]	Fixed value, not to be modified
13-52 [4]	Action 4	Run [22]	Fixed value, not to be modified

For further product information and detailed parameters overview, please refer to the following technical literature:

Operating instructions   MG02A402
Programming Guide   MG02C402

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