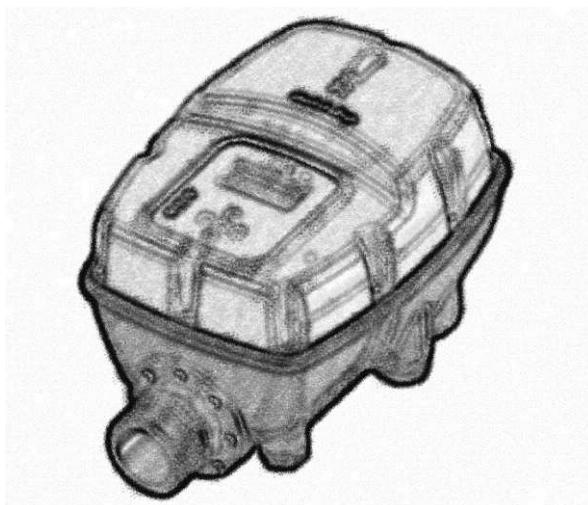# Sirio
Universal

PT	Manual de programação	Manuale di programmazione	IT
GR	Εγχειρίδιο προγραμματισμού	Programming manual	EN
CZ	Programovací příručka	Manuel de programmation	F
SK	Návod na programovanie	Programmieranleitung	DE
NL	Programmeerhandleiding	Manual de programación	E
RO	Manual de programare	Руководство по программированию	RUS

Rel. 2.0   04/2020
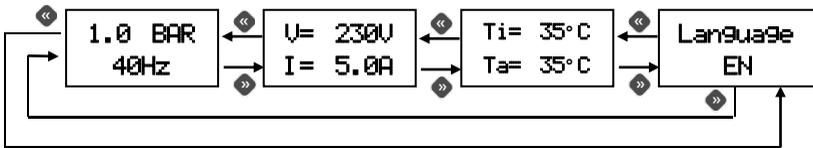
💾 PROGRAMMING

EN

✔ DESCRIPTION OF THE BUTTONS

« Left-hand arrow: this scrolls back through the menu pages

» Right-hand arrow: this scrolls forwards through the menu pages

ON/OFF RESET On-Off/Reset: this switches the device from stand-by to operation mode and resets the unit in the event of alarms and/or errors.

+ "+" button: this increases the value of the parameter currently shown on the display, it allows the pump to run at top speed without the dry running protection feature cutting in.

− "-" button: this decreases the value of the parameter currently shown on the display.

✔ MAIN MANU STRUCTURE

The main menu shows the operational values of the system: pressure, current frequency of the motor, input voltage, output current of the motor and internal temperature of the inverter. It is also possible to select the language.

```
«          «          «          «
┌──────────┐  ┌──────────┐  ┌──────────┐  ┌──────────┐
│ 1.0 BAR  │← │ V= 230V  │← │ Ti= 35°C │← │ Language │
│   40Hz   │  │ I= 5.0A  │  │ Ta= 35°C │  │    EN    │
└──────────┘→ └──────────┘→ └──────────┘→ └──────────┘
    »            »            »            »
```

✔ DESCRIPTION OF THE PARAMETERS AND SCREEN PAGES

MAIN MENU:

These screen pages are accessible when the device is on.

```
┌──────────┐
│ 1.0 BAR  │
│   40Hz   │
└──────────┘
```
Main screen page: when *Sirio* is operating correctly, the first line of the display shows the instantaneous pressure detected by the system; the second line shows the current frequency of the motor. From here, it is possible to scroll through the main menu using the arrows, or put the system in "Stand-by" by pressing the central "on-off" key.

```
┌──────────┐
│ 1.0 BAR  │
│ Stand-by │
└──────────┘
```
When *Sirio* is in stand-by, the pump will not start up even if the pressure drops below the "Pmin" value set. To exit stand-by, press the central button again. By holding down the "+" button, the pump is brought up to the maximum operating speed, overriding the dry running protection (use this function to fill the pump on initial start-up).

```
┌──────────┐
│ V= 230V  │
│ I= 5.0A  │
└──────────┘
```
Voltage and current screen: on this page of the menu it is possible to view the input voltage to the inverter and the current absorbed by the motor. The value of the output current to the motor may differ from the value of the input current as the inverter modulates both frequency and voltage.

```
┌──────────┐
│ Ti= 35°C │
│ Ta= 35°C │
└──────────┘
```
Temperature screen: this displays the ambient temperatures inside the inverter and the IGBT power module. The values of these temperatures contribute to the intelligent power management which limits the value of the maximum frequency of the motor when the pre-alarm thresholds are reached.

```
┌──────────┐
│ Language │
│    EN    │
└──────────┘
```
Language: The language used for the menus and the alarm messages can be selected by the user. Use the + and – buttons to alter the parameter setting.

INSTALLER PARAMETERS:

These parameters can be found on hidden pages and usually they should only be changed in the installation phase. To access these pages switch the device to Stand-by and keep the "+" and "-"buttons pressed down together for 5 seconds. Once you have entered the hidden menu, use the "<<" and ">>" buttons to scroll the pages and the "+" and "-" buttons to change the parameters. To return to the main page press the button in the centre. **Some parameters may not be displayed if the relative function is not enabled.**

```
 Pmax
3.0 BAR
```

Pmax: this parameter enables entry of the set-point value of the device. It is a constant pressure value required by the system (maximum pressure). During its operation *Sirio* regulates the revs of the electric pump to adapt them to the actual required flow-rate, therefore maintaining the constant pressure of the system. When it is necessary to set the Pmax to a value higher than the maximum pump head, motor shut down on valve closure is only guaranteed if the flow switch is activated, as *Sirio* switches off the pump when the flow of water passing through it falls below the minimum values (approx. 2 litres/minute) irrespective of the pressure reached in the system.

```
Dp.start
0.5 BAR
```

Delta P start-up: this parameter sets the delta negative of pressure compared to Pmax for the start-up of the pump. On opening of any type of utility, the pump will not start-up until the system pressure has fallen below Pmax by a value equal to the delta set in this parameter. After the motor is started up, the operating rotation speed is controlled to maintain the pressure value as close as possible to that set in the parameter Pmax. The minimum differential settable between Pmax and Pmin is 0.3 Bar, with the recommended value being at least 0.5 Bar.

```
P.dr.ru.
0.5 BAR
```

Dry-running pressure: this parameter only affects operation with the flow switch deactivated. Define the minimum pressure value below which, with the motor at maximum frequency, the protection against dry-running triggers.

```
P.Limit
9.0 BAR
```

Pressure limit: this parameter sets the threshold for the overpressure protection intervention.
The overpressure protection intervention stops the inverter until the user resets it.

```
 Pmax2
9.0 BAR
```

Pmax2: this parameter enables entry of the secondary set-point of the device. When the auxiliary contact (or the auxiliary I/O board input) is closed externally, the pressure value set in Pmax2 becomes the new set-point, according to which *Sirio* regulates the revs of the electric pump.

```
Dp.stop
0.5 BAR
```

Delta P stop: this parameter sets the positive pressure delta compared to Pmax for immediate shutdown of the pump. During normal operation, when the valves close, the pump stops after a time set in the parameter "stop delay". In any case, if the system pressure exceeds the Pmax value of a delta greater than that set in this parameter, the pump will stop immediately to avoid overpressure which may damage the system.

```
 Unit
 BAR
```

Unit of measurement: select the unit of measurement in BAR or PSI

```
 Imax
0.5 Amp
```

Imax: this parameter enables entry of the maximum current absorbed by the electric pump in routine conditions, to enable shut-down of the motor in the event of excessive absorption. The motor is also shut down if the current read during operation is below 0.5 A following interruption of the connection between the motor and *Sirio*. The trip time of the current overload safety device is inversely proportional to the entity of the overload in progress; therefore a slight overload will lead to a more delayed trip time while a more significant overload will accelerate the trip time. On activation of the device, if the Imax parameter is set at 0.5 A (factory setting), the display automatically shows the settings page of the maximum current and no action is permitted until the absorption limit value is set.

```
Rotat.
 -->
```

Rotation direction (only for three-phase pump version): this screen enables the user to invert the direction of rotation of the electric pump without modification to the electric motor wiring. To modify the direction of rotation of the motor, use buttons "+" and "-"; the direction indicated by the arrow has a purely indicative value and does not reflect the actual sense of rotation which must be verified by the installer.

```
Min.fre.
25 Hz
```

Minimum frequency: this parameter defines the minimum frequency at which the pump starts up and stops. For three-phase pumps a value of 25Hz is advised, for single-phase pumps 30Hz.Also consult the information supplied by the manufacturer of the electric pump to determine at what minimum frequency value the connected electric motor can operate

```
Stop fr
30 Hz
```

Stop frequency: only during operation without the flow switch, this parameter determines the minimum frequency value below which the motor will stop. During adjustment, if the Pmax pressure value is reached and the frequency of the motor is below this value, the inverter will attempt to stop the motor. If all the utilities are closed and the pressure remains constant the pump will stop correctly. If the pump does not stop, try to increase this value. By contrast, if the pump carries out continuous start-up and stop cycles, try to lower the stop frequency value.

```
Nom.fre.
50 Hz
```

Nominal motor frequency: depending on which motor is used, it is possible to select a maximum nominal output frequency from the inverter (50 or 60 Hz). Caution: an incorrect selection of the maximum frequency may cause damage to the pump; consult the manufacturer's technical data carefully.

```
Swit.fr.
5 kHz
```

Switching frequency: set the frequency of inverter switching. The selectable values are 3, 5 and 10 kHz. Higher switching frequency values may reduce the noise of the inverter and allow a more fluid regulation of the motor but may cause increased temperatures in the electronic board, an increase in electromagnetic disturbances and potential damage to the electric motor (especially with long cables). Low switching frequency values are recommended for medium-large pumps, where there is a long distance between the inverter and motor or high ambient temperatures.

```
Fre.cor.
0 Hz
```

Frequency correction: this parameter enables entry of a deviation, positive or negative, of the maximum

requency compared to the set nominal value. It may be useful to set a negative deviation (up to ⎯5Hz) where a limit to the maximum power of the electric pump is wanted and to avoid possible overload. A positive increase (up to +5Hz) may instead be necessary when a slightly higher electric pump performance is needed. While no particular precautions exist in lowering the maximum frequency, its increase must be carefully evaluated after having consulted the manufacturer of the electric pump and taking into consideration the maximum current supported by the inverter.

```
S.Start
ON
```

Soft-Start (progressive start-up): This screen enables the user to activate or deactivate "soft-start" function. When this function is active the pump starts up progressively; by contrast, the start-up is always at maximum revs for a period of 1 second before the adjustment of revs begins.

```
Pump
1X230V
```

Pump type: set the type of the pump connected to Sirio, single phase with starting capacitor (1 X 230V) or three-phase with delta connection (3 X 230V).

```
Flow.se
ON
```

Flow sensor: this activates or deactivates operation of the integrated flow switch. The factory setting of the flow switch is active, so that the pump will stop when the valves close, detecting a zeroing of the flow through the inverter. The same principle is used for the protection against dry-running. In any case, conditions may occur (for example, the use of not perfectly clean water) which could impair correct operation of the flow switch preventing the pump from stopping correctly. In these conditions, it is possible to deactivate the flow switch and operate the Sirio exclusively on the basis of pressure and frequency information. In this case it is essential to correctly regulate the parameters of the stop frequency and dry-running pressure for efficient operation of the inverter. Furthermore, when the flow switch is deactivated, it is necessary to install an expansion tank immediately after the Sirio to help regulate the pressure in the stop phase and avoid continuous restarts of the pump, taking care to periodically check the pre-load values.

```
Command
PRES
```

Command origin: selects the command source. If the parameter is set to pressure, the operation is regulated automatically based on the system pressure. Otherwise, if set to manual mode, it is possible to manually command start-up, stop and the speed of the electric pump directly via the keyboard. Caution: in manual mode, the dry-running and pressure limitation protections are not active. This mode should only be used temporarily and under the direct control of a person. Pay maximum attention during these operations!

```
Aux.con
1 <->
```

Auxiliary contact: use this parameter to select the function to be associated with the auxiliary contact; the settable values are as follows:
"1 <->" the auxiliary contact is used for the connection of two *Sirio* devices in a twin pressurisation unit (factory settings)
"2 <-" the auxiliary contact is used to remote control the start/stop of the motor pump.
"3 X2" the auxiliary contact is used to control a second pressure set-point (Pmax2).

```
I/O in.
OFF
```

Input function on the I/O board: determines the function associated with the digital input of the auxiliary I/O board (available on request).
The settable values are:

"OFF" input disabled
"ERR" error signal: on closure of the auxiliary input, the pump will immediately shut down and "External error" will appear on the screen. Use this function if it is necessary to stop the inverter due to an external error.
"2 <-" the auxiliary input is used for remote control of start-up and shut-down of the electric pump; if the same setting is also active for the parameter "Aux. Con", it is necessary to close both contacts to start the motor (AND logic)
"3 X2" the auxiliary input is used to control a second pressure set-point (Pmax2); the auxiliary input is used to control a second pressure set-point (maxP2); if the same setting is also active for the parameter "Aux. Con", it is necessary to close one of the two contacts to control the second set-point (OR logic).

```
I/O out
  OFF
```

Input function on the I/O board: choose the function associated to the digital input of the auxiliary I/O board (available on request).
The settable values are:

"OFF" output disabled
"ERR" error: the output is activated (closed contact) in the presence of any error in *Sirio*
"P.ON" pump in operation: the output is activated (contact closed) whenever *Sirio* controls the pump start-up
"AUX" auxiliary pump: enables control of an auxiliary pump at a set speed which starts up when the pump controlled by Sirio is no longer able to fulfil the needs of the system. The output is activated (closed contact) when the frequency of the pump is at the maximum admissible value and the pressure drops below the minimum start-up value. Caution: it is not possible to connect a load superior to 0.3° to the output relay! Consult the documentation supplied with the I/O auxiliary board for the correct connection to an external control panel.

```
Stop.del
10.0sec
```

Delay on stop: this parameter enables the user to set after how many seconds the electric pump is stopped following the closure of all utilities. If continuous start-up and stop of the pump is detected with low flows, increase the delay before stopping to make operation more uniform. It may be useful to increase this parameter also to avoid excessively frequent intervention of the dry-running protection, especially in submerged pumps or on those with problems in self-priming. The factory setting is 10 seconds.

```
Reset
15 min
```

Auto-reset-interval: during operation of the electric pump if a temporary absence of water on intake is detected, *Sirio* will shut off power to the motor to avoid it being damaged. On this screen it is possible to set how many minutes the device will remain stopped before carrying out an automatic restart to check for the availability of water on intake. If the attempt is successful, *Sirio* will automatically exit from the error condition and the system resumes normal operation; if this is not the case, another attempt be will be carried out after the same time interval. The maximum settable interval is 240 minutes (recommended value is 60 min).

```
Reset
5 test
```

Auto-reset test n.: this parameter sets the number of attempts that *Sirio* will perform to resolve a stop condition due to dry running. Once this limit has been exceeded, the system shuts down and the user's intervention is required. If this value is set to zero, the auto-reset function is switched off. The maximum number of attempts allowed is 20. Use buttons + and — to modify the parameter value.

```
Reset
Full.OFF
```

Total automatic reset: when set to ON, the automatic reset function is active for any error, in addition to dry-running, detected by the system. Caution: the automatic and uncontrolled reset of some errors (for example, overload) could over time cause damage to the system and to Sirio. Always take great care when using this function.

ADVANCED PARAMETERS:

The advanced parameters are accessible only to the technical assistance service. For access to these parameters, it is necessary to contact the re-seller, a technical assistance centre or the manufacturer.
The following table lists the advanced parameters for reference when technical assistance is required.

REF.	PARAMETER	DESCRIPTION
3.0	Pressure calibration 0.0 Bar	To carry out calibration of the pressure sensor at 0 Bar
3.1	Pressure calibration 5.0 Bar	To carry out calibration of the pressure sensor at 5 Bar
3.2	Flow sensor calibration	To carry out calibration of the flow sensor
3.3	Pressure test	Current pressure test signal
3.4	Flow switch test	Flow switch test signal
3.5	Software Release	Release of software
3.6	Power supply timing	Inverter power supply timer
3.7	Pump timing	Electric pump operational timer
3.8	Last error	Last error occurred log
3.9	Start-up	Pump start-up counter
4.0	Vboost	Voltage boost at 0Hz
4.1	Dry run	Time delay before activation of the protection due to no water
4.2	Protection starts per hour	Activation or deactivation of the control on the number of start-ups per hour (leak checks)
4.3	Anti-blockage protection	Activation or deactivation of a function that automatically starts up the pump after 24 hours of disuse
4.4	Dead time PWM	Dead time PWM setting
4.5	Ki	PID controller integral constant
4.6	Kp	PID controller proportional constant
4.7	Boost time	Boost time at maximum frequency with soft start disabled
5.0	Ta max	Maximum ambient temperature
5.1	Tm max	IGBT module maximum temperature
5.2	Ta reduction index	Frequency reduction index on ambient temperature
5.3	Tm reduction index	Frequency reduction index on module temperature
5.6	Minimum voltage	Minimum power supply voltage threshold
5.7	Maximum voltage	Maximum power supply voltage threshold
5.9	Debug Variable	Debug variable selection for process value display

✔ ALARMS

In the event of system anomalies or malfunctions, one of the following screens will appear on the Sirio display. Each error is coded with the letter "E" followed by a number from 0 to 13. The number which appears in brackets represents the number of recurrences of each error. To reset an alarm, after having resolved the cause, it is usually sufficient to press the central "reset" key or interrupt the electrical power supply for a few seconds.

```
E0 ( 0)
Lo.Volt
```

E0 – Low voltage: indicates that the power supply voltage is too low. Check the input voltage value

```
E1 ( 0)
Hi.Volt
```

E1 – High voltage indicates that the power supply voltage is too high. Check the input voltage value

```
E2 ( 0)
Shortcir
```

E2-Short Circuit: This message will appear on the screen when a short circuit is detected at the inverter output; this may occur following incorrect connections of the electric motor, damage to the electrical insulation in the wires which connect the electric pump to the device or a fault in the pump's electric motor. When this error appears the electrical system should be checked as soon as possible by specialised personnel. The error may only be removed by disconnecting the equipment from the electrical power source and resolving the cause of the fault. Attempting to restart the inverter in the presence of a short-circuit in output may cause serious damage to the equipment and be a source of danger to the user.

```
E3 ( 0)
Dry run
```

E3-Dry running: this message appears when the system is stopped following a pump intake water shortage. If the auto-reset function has been enabled, the *Sirio* will carry out automatic attempts to check for the availability of water. To clear the error status, press the central "reset" button.

```
E4 ( 0)
Amb.Temp
```

E4- Ambient temperature: the error appears if the maximum internal ambient temperature of the inverter is exceeded. Check the conditions of operation of the inverter.

```
E5 ( 0)
IGBTtemp
```

E5-module temperature: the error appears if the maximum temperature of the IGBT module of the inverter is exceeded. Check inverter operating conditions, in particular the water temperature and the current absorbed by the pump.

```
E6 ( 0)
Overload
```

E6-Overload: this alarm is displayed when electric pump absorption exceeds the maximum set current as entered in the Imax value: this may occur following intensive use of the electric pump, continuous restarts at close intervals, problems with the motor windings, or following problems with the electrical connection between the motor and *Sirio*. If this alarm trips frequently, arrange for the system to be checked by the installer.

```
E8 ( 0)
Ser.Err.
```

E8-Serial error: this alarm may occur where there is an internal serial communication on Sirio. Contact the technical assistance.

```
E9 ( 0)
Ov.Pres
```

E9-Pressure limit: the alarm intervenes when the maximum set pressure threshold has been exceeded. If the error appears repeatedly, check the setting of the "P limit" parameter. Also check other conditions which may have caused an overpressure (for example, partial freezing of the fluid).

```
E10( 0)
Ext.Err
```

E10- External error: this alarm will be displayed if, after having set the external error function on the auxiliary I/O board, the I/O input contact is closed.

```
E11( 0)
Start/H
```

E11-Number of maximum starts/hour: this error appears if the maximum number of admissible start-ups per hour has been exceeded. Check for the presence of any leaks in the system. Check the pre-loading of any installed tanks.

```
E12( 0)
Err.12V
```

E12- Error 12V: an anomaly has been detected in the internal low voltage power supply circuit. Have the manufacturer check the device.

```
E13( 0)
Pres.Sen
```

E13- Pressure sensor error: the pressure sensor has detected an incorrect value. Have the manufacturer check the device.

❓ POSSIBLE MALFUNCTIONS:

✔ When one of the taps / outlets in the system is opened, the pump does not start, or there is a few seconds delay before it starts

The DeltaP value is set too high or a check valve has been fitted downstream of the device. Try to increase the value of the start-up pressure Pmin and eliminate any valves after the *Sirio.* Ensure correct operation of the external enabling contact.

✔ When the taps / outlets are closed, the pump stops but restarts a few seconds later and there is no leakage from the system

Dp start" value is too low, increase it.

✔ The pump keeps switching on and off

There is leakage in the system. Check the various hydraulic connections. Check the display for pressure drops when the taps are closed. Check the *Sirio's* check valve for dirt which could be preventing it from closing properly and, if necessary, clean it with compressed air.

✔ The device often signals 'dry running'

The pump intake pipe drains when the system is not used for some time, thereby preventing it priming the next time it is started. If there is a foot valve fitted, check its seal.

✔ The device often signals 'high or low voltage'

The power supply voltage may not comply with the device specifications; have it checked by qualified personnel.

✔ The device overheats and the over-temperature protection intervenes

The inverter no longer exchanges heat with the water that runs through the device or the temperature of the fluid pumped is too high; check for foreign bodies that block the flow of water and if necessary have the device checked by the manufacturer.

✔ When the water flow is extremely low, the pump does not operate normally

The flow values are too low and as the device is unable to detect them, it shuts down the motor pump. Fit a small surge tank (1-2 litres) in the system to give it more flexibility and reduce the number of restarts.

✔ The pump does not stop

There is substantial leakage in the system or the check valve on the device is jammed by dirt; try moving the check valve with your fingers and checking that the spring can maintain the seal.
The sensor which detects the valve position is broken. Have the device checked by the manufacturer.

✔ The pump is running at top speed but performance levels are low

The pump or the capacitor connection is not correct: check the electric wiring.
The pump runs in the opposite direction (three-phase model); check rotation direction.
The pump is damaged or there is foreign matter clogging the waterway.

✔ When more water is required of the system, the pressure drops

This is a normal condition which is due to the fact that the device is unable to force the pump above its capacity curve. As a result, once a certain capacity is reached, the pressure is no longer offset as the pump is already running at the highest number of revolutions allowed. In these cases, a pump with higher performance levels should be installed.

⚒ MAINTENANCE:

The *Sirio* is designed to keep maintenance requirements at a minimum. To guarantee the device a long working life and perfect functionality, always follow the instructions below:

- ensure the device does not have to withstand temperatures of below 3° C; if this is not possible, make sure all the water inside it is drained out to prevent it from freezing up and damaging the device's plastic body;

- if the pump is equipped with intake filters, carry out regular checks to ensure they are clean;

- always ensure that the cover is closed properly and the cable conduit is tight to prevent water from penetrating from outside;

- switch off the power supply and drain the water from the system when it is going to be left unused for some time;

- do not force the pump to run without intake water, as this could damage both the pump and the *Sirio*;

- before using the device with any other liquids than water, contact the manufacturer.

- do not carry out any operations when the device is open

- wait 3 minutes before removing the cover from the device so the condensers can discharge.

⚠ **WARNING: this device does not contain any parts that can be repaired or replaced by the end user. You are thereforeadvised not to remove the electronic card's protective cover as this would lead to forfeiture of the guarantee!**