

USER AND MAINTENANCE MANUAL

AQUA JONIC PLUS DUPLEX 24V

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CHAPTER 1 - INTRODUCTION

1.1 GENERAL INFORMATION

The JONIC PLUS DUPLEX module controls a demineralizing system, that operates with two autonomous lines, and uses level, pressure, and conductivity sensors present within the system.

The JONIC PLUS DUPLEX module consists of:

- A JONIC PLUS DUPLEX CONTROL UNIT;
- AN EXPANSION MODULE.

Pretreatment may be activated in various ways based on the programmed settings.

Regeneration may be activated automatically after the programmed number of treated liters of water have been counted or after the high-conductivity delay.

Regeneration may also be activated manually by pressing the key provided on the module's panel.

The module lets the operator select the various system functions using a keyboard and the LED display assembled on it.

The module is equipped with a floating battery which will power the internal clock and dynamic memory in the case of a power failure, allowing the system to restart operation where it was interrupted.

The card's static memory maintains the program's initialization data, customized by the user, for at least 10 years even in the case of floating-battery failure.

1.1.1 UNPACKING

During transport and storage, the module is placed in individual cardboard containers in which the controller is protected by expanded polystyrene cushions.

Special unpacking operations are not necessary.

CHAPTER 2 – TECHNICAL CHARACTERISTICS

2.1 – POWER SUPPLY

- Voltage : 24 VAC \pm 10 %
- Frequency : 50 or 60 Hz \pm 3 %
- Type of wave : sine wave
- Absorbed power without load : 20 VA
- Maximum absorption during operation : 30 VA

2.2 – INPUT SIGNAL CHARACTERISTICS

- Conductivity sensor (probe with K = 1 efficiency) : values between 0.1 and 250 μ S on two scales (0.1 \div 25.0; 1 \div 250).
- Level, pressure, flow sensors input : ground connection with Max = 10 mA current and Max = 15 VDC voltage.
- Input isolation : with opto-electronic devices and simple isolation.
- Liter-counter probe input : ground connection impulse with maximum $I_{SOURCE} = 2$ mA and $V_{PULLUP} = 5$ VDC.

2.3 – OUTPUT SIGNAL CHARACTERISTICS

- Electrovalve and alarm control : 24 VAC, 1 A Max free contact
- Electrovalve maximum switchable current : 5 A on resistive load
- Ciclo V132 motor control : output for synchronous motor at 50 or 60 Hz, 4 VA maximum, 12 VAC \pm 20 %.
- Hall-effect liter-counter sensor power supply : 15 VDC, 15 mA maximum.

2.4 – PROTECTION DEVICES

The module has two protection fuses as described below:

- 1.6 A delay mains fuse assembled on the Jonic Plus XA503-15 control unit panel;
- 1.6 A delay mains fuse assembled on the XA371-01 expansion module printed circuit board.

2.5 – PHYSICAL CHARACTERISTICS

The device's physical characteristics are shown below.

a. Control module dimensions:

- Width : 240 mm
- Height : 185 mm
- Depth : 155 mm
- Width with door open : 265 mm
- Weight : approx. 1.55 Kg

Duplex expansion module dimensions:

- Width : 200 mm
- Height : 155 mm
- Depth : 85 mm
- Weight : approx. 1 Kg

b. Degree of protection:

The degree of protection of the control module's housing is IP65:

- totally protected against dust;
- protected against jets of water.

c. Environmental conditions:

The device operates and was designed to run in industrial and domestic environments. The environmental reference parameters are therefore the following:

- Operation temperature : 0°C ÷ +40°C
- Storage temperature : -10°C ÷ +60°C
- Relative humidity : 85% at 31°C

Use of the device in places having special environmental characteristics (explosion-proof environments, etc.) or characteristics different from those stated above is not foreseen.

ATTENTION

Use of the module in unforeseen environments or situations will release P.W.I.
S.r.l. from responsibilities deriving from such use.

CHAPTER 3 - INSTALLATION

3.1 ELEVATED ASSEMBLY

The module was designed and constructed to be installed on walls by means of a hook attached to the wall itself.

The module must be positioned so that the operator has the space which is required for installation, maintenance, and use.

3.2 INTERFACE CONNECTION

The connections are made by means of terminal boards present on the power supply board of the module and the expansion board. These terminal boards are:

- the module's terminal board: power supply, digital inputs and outputs, communication signals with expansion module;
- the expansion module's terminal board: power supply, analog input signals and outputs.

The connections must be made according to what is shown on the attached IXA620-01 application drawing.

The connections must be made using cables having the characteristics stated below.

- The device must be connected to the pump, electrovalve, and alarm external loads using cables which conform with current norms and have the following dimensions:
 - thickness : 1.5 mm²
 - length : < 3 mt
- The device must be connected to the external sensors using cables which conform with current norms and which have the following dimensions:
 - thickness : 0.5 mm²
 - length : < 3 mt
- The device must be connected to the conductivity probe using shielded cable which conforms with current norms. Its protective braiding must be connected to terminal 65 of the connector located on the power supply board. Furthermore, two ceramic filters, whose **common contact** must be grounded (braiding of shielded cable or terminal no. 65), must be connected onto the probe's bonding wires. The cable must be less than 3 mt. long.

3.3 MAINS CONNECTION

The device must be connected to the mains using a step-down transformer (230 VAC - 24 VAC) created and installed according to current safety norms.

CHAPTER 4 - OPERATION

4.1 GENERAL INFORMATION

During normal operation, the module controls the water conductivity of the system's two lines. The recirculation pump of the two lines is kept on during this phase. If a request for water occurs, the recirculation pump is turned off (this may or may not occur depending on how the relative flag is programmed) and the service valve relating to the selected line is activated.

If the conductivity value exceeds the programmed set point, the drainage valve of the line relating to the set point is also activated (if water was requested, the service valve is deactivated and the drainage valve is activated) and the set point LED on the front panel comes on. If the module is programmed for manual operation, the alarm signal will be activated after the programmed delay. If it is set for automatic operation, a regeneration cycle will start unless an inhibit condition or a general alarm exists which prevents the cycle from starting.

Each of the two lines operates autonomously. The signals shown by the displays and LED's are only valid for the selected line.

The cycle may be started according to the type of set point programmed in the flags. A different cycle startup mode may be programmed for each of the two lines:

- **AUTO VOLUME:** Regeneration automatically starts after the liters have been counted.
- **AUTO SETPOINT:** Regeneration automatically starts after the delay programmed for the high-conductivity alarm or when the read conductivity is higher than the programmed set-point value.
- **MIXED:** Regeneration automatically starts after counting or because of high-conductivity.
- **MANUAL:** In this case the module may activate the cycle only when the provided key is pressed. Regeneration will only be started for the selected line. In manual operation, the module goes into an alarm state if an automatic startup condition occurs.

All of the valves relating to the regeneration line are turned off during the regeneration cycle and the Regeneration in Progress output is activated.

If the relative flags are enabled, line exchange is carried out at the beginning of the regeneration cycle. Therefore, if regeneration is activated for line A, line B is automatically selected and vice versa. Exchange may also be enabled on a single line (for example, the exchange takes place if regeneration is activated for line A, but not for line B).

Furthermore, the Super Automatic function may be used. This function may be enabled for one or both of the lines. This function prevents a chain of regenerations from being carried out if previous regeneration was unsuccessful or if, after the regeneration cycle, water conductivity remained at a value higher than the programmed set point. The presence of an alarm due to this function may be verified by looking at the LED which signals Super Automatic enabling: an alarm is present if it is blinking.

A mode may be activated with Super Automatic which allows the regeneration cycle to be interrupted if conductivity is found to be less than the programmed set point during the last phase. In this case, if said condition is read for at least 4 consecutive minutes, the remaining time will be set at zero and the cycle will be exited. Otherwise (water with conductivity higher than the set point), an alarm will be signaled upon exiting.

Important note regarding the Super Automatic mode: Conductivity is not tested during the first 3 minutes of the last phase. If the stop time is therefore less than 7-8 minutes, an alarm will be signaled upon exiting.

If water is requested from the accumulation tank, the service valve is opened (only when conductivity is lower than the set point).

If enabled, the module may operate the two lines in parallel. In other words, if water is requested both lines are placed in service (and the relative outputs are activated). In the case in which the lines are running in parallel, they remain independent during the rest of operation. Therefore, if both lines are in service during parallel mode and a conductivity value above the set point is read on one of them, the line in question closes the service valve and turns on the recirculation pump and the drainage valve. When the set delay has finished, regeneration is started or an alarm is activated depending on how the line is programmed. The other line remains in service.

The parallel mode functions even if the module has finished counting cubic meters. The line which has finished counting will therefore start regeneration (if the appropriate flag is enabled).

Another mode is the Support function. If the active line reaches the set point when water is requested, the other line's service valve is opened if the appropriate flag is activated. This lets the system continue to receive an uninterrupted supply of water.

IMPORTANT NOTES

- Some of the input sensors may not be used. These must be left open so that they are simulated as operational. Module operation will be inhibited if this norm is not observed.
- If an inexistent or disabled code is selected during programming, the module returns to the operation state.
- If no keys are pressed for more than 30 seconds during programming, the module automatically exits the programming phase and returns to the operation state.
- When the various settings have been completed, the display and LED's will blink quickly. This blinking confirms that the programmed data has been saved in EEPROM.

4.2 CONTROL PANEL DESCRIPTION

The control panel is shown in fig. 1. The panel consists of:

- a 6-key multifunctional keyboard;
- a 4-digit LED display;
- 8 indicator lights for representing the system's operation and alarm states.
- a main Start-Stop switch (indicated as S1 in figure 1);
- a fuse holder (F1) with a 1.6 A delay protection fuse.

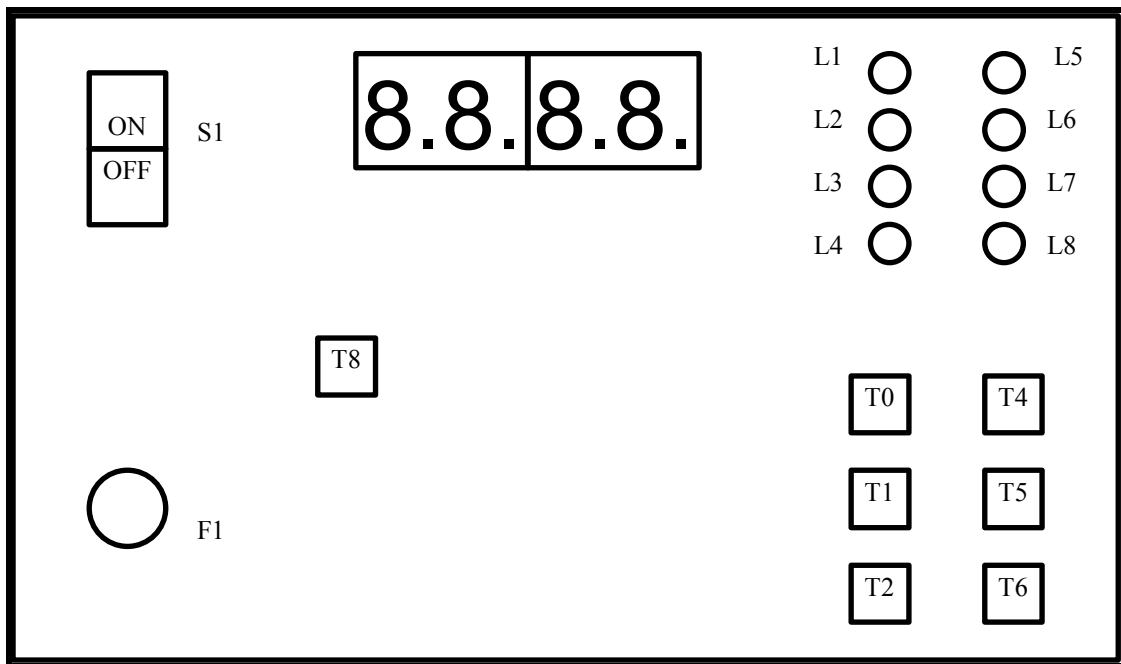


Figure 1: Layout of keys and LED's on the XA620-15 module.

4.2.1 DISPLAY

The 4-digit display used on the board shows a series of data regarding operation. The displayed data are:

- the measured conductivity value, which will appear as **xxxx** if the 1-250 μ S scale is selected or as **xxx.x** if the 0.1-25 μ S scale is selected.
- regeneration, the display visualizes **nCxx** where **n** is the regeneration cycle phase number and **xx** represents the remaining time for movement in seconds before the stop phase or the remaining time in minutes of the stop phase before going on to the next phase. If no phase is active, **----** appears on the display.
- the programmed set-point value, **x.x.xx** appears;
- liters of treated water still available before regeneration, **xx.xx** appears;

4.2.2 INDICATOR LIGHTS

The board has 8 LED's with the following functions:

LED	NAME	MEANING
L1	A	If on, line A was selected. The data visualized by the display and the LED's regard this line.
L2	ALARM	High-Conductivity Alarm. If on, the programmed delay time between the reading of the value which exceeds the set point and the alarm is finished. This LED only regards the active line. If automatic operation is programmed, this LED does not come on. The regeneration cycle, however, begins.
L3	EXT. ALARM	Inhibit. If on, a signal which inhibits automatic startup of the regeneration cycle is present. This LED only regards the active line.
L4	AUTO VOLUME	Defines, with LED L8, the module's type of operation and the regeneration cycle's startup mode.
L5	B	If on, line B was selected. The data visualized by the display and the LED's regard this line.
L6	SET POINT	Set Point. If on, the conductivity value exceeds the programmed set point. This LED only regards the active line.
L7	SUPER AUTOMATIC	Super Automatic Mode Active. If on, the alarm for irregular regeneration is enabled. During the final cleaning phase, if conductivity is not restored below the programmed set-point value, the module is inhibited and this LED blinks, preventing a chain of regenerations. To remove the alarm, press the RESET key. This LED only regards the selected line.
L8	AUTO SET POINT	Defines, with LED L4, the module's type of operation and the regeneration cycle's startup mode.

All of the LED's operate in relation to the selected line and display its state. To display the state of the other line, select it using the provided key.

Possible combinations for L4 and L8 are shown in the following table with their meanings:

L4	L8	OPERATION MODE
OFF	OFF	MANUAL
OFF	ON	CONDUCTIVITY
ON	OFF	CUBIC METERS
ON	ON	MIXED

4.2.3 BUTTONS

The board has 7 buttons:

KEY	NAME	MEANING
T0	CODE	Used to access parameter modification. The password is requested when this key is pressed.
T1	RESET	The current cycle may be aborted during regeneration. During normal operation it resets all of the alarms. During the programming phase, exiting is carried out without saving the modifications in EEPROM.
T2	PROGRAM MODE	If the programmed password is 0000, programming of the module's operation parameters may be accessed.
T4	SELECT A/B	Selects the line. The data visualized by the display and the LED's become those of the selected line. To verify which line was selected, check whether LED L1 (A) or LED L2 (B) is on.
T5	ADVANCE	The type of data shown by the display may be modified. During the programming phase it modifies the value of the displayed data.
T6	MANUAL REGEN	Causes immediate startup of the active line's regeneration cycle. If enabled, exchange takes place between the two lines when the manual cycle begins.
T8	RESET HARD	A general reset of the module takes places and the programmed values saved in EEPROM are reloaded. This key is hidden. It must be pressed only as a last resort to restart the module. If the module jams for any reason, wait approximately 10 seconds. The module will then automatically do a general reset. If it is not able to reset operation, use this key.

4.3 FUNCTIONS

The board is equipped for the following extra functions:

- timer which may be programmed for a conductivity alarm.
- programming password to prevent modification.
 - TTL-level serial output with 1,200 baud rate and 7-bit data. To use this special function, the special XA205-01 interface and the relative software program for communicating with the PC must be used.

4.4 PROGRAMMING

Module operation may be programmed using a series of codes, each of which permit access for programming a defined series of parameters:

CODE	MEANING
SC01	Programming of line A regeneration cycle.
SC02	Programming of line B regeneration cycle.
SC03	Programming of delay timers.
SC04	Set point programming.
SC05	Cubic meters, prescaler, and dosing pump programming.
SC06	Not used
SC07	Password programming.
SC08	Programming of module operation flags.
SC09	Transfer of programmed cubic meters and counter prescaler to operation records without waiting for completion of regeneration.

4.4.1 – PROGRAMMING OF LINE A REGENERATION CYCLE

To access this phase, set code SC01. To modify the values, use the ADVANCE key.

The following data are programmed in the following order:

DATA	DESCRIPTION	DEFAULT	MIN	MAX
C-08	Number of regeneration cycle stops		01	08
SA15	Duration of movement in seconds		00	98
1A01	Duration of the first cycle stop in minutes		00	98
2A01	Duration of the second cycle stop in minutes		00	98
3A01	Duration of the third cycle stop in minutes		00	98
4A01	Duration of the fourth cycle stop in minutes		00	98
5A01	Duration of the fifth cycle stop in minutes		00	98
6A01	Duration of the sixth cycle stop in minutes		00	98
7A01	Duration of the seventh cycle stop in minutes		00	98
8A01	Duration of the eighth cycle stop in minutes		00	98

4.4.2 - PROGRAMMING OF LINE B REGENERATION CYCLE

To access this phase, set code SC02. To modify the values, use the ADVANCE key.

The following data are programmed in the following order:

DATA	DESCRIPTION	DEFAULT	MIN	MAX
C-08	Number of regeneration cycle stops		01	08
Sb15	Duration of movement in seconds		00	98
1b01	Duration of the first cycle stop in minutes		00	98
2b01	Duration of the second cycle stop in minutes		00	98
3b01	Duration of the third cycle stop in minutes		00	98
4b01	Duration of the fourth cycle stop in minutes		00	98
5b01	Duration of the fifth cycle stop in minutes		00	98
6b01	Duration of the sixth cycle stop in minutes		00	98
7b01	Duration of the seventh cycle stop in minutes		00	98
8b01	Duration of the eighth cycle stop in minutes		00	98

4.4.3 – DELAY PROGRAMMING

To access this phase, set code SC03.

To modify the values, use the ADVANCE key.

The following data are programmed in the following order::

DATA	DESCRIPTION	DEFAULT	MIN	MAX
0t01	Delay in minutes for line A conductivity alarm		01	98
2t01	Delay in minutes for closing line A drainage valve		01	20
4t01	Delay in minutes for line B conductivity alarm		01	98
6t01	Delay in minutes for closing line B drainage valve		01	20

4.4.4 – SET POINT PROGRAMMING

To access this phase, set code SC04.

To modify the values, use the ADVANCE key.

The following data are programmed in the following order:

DATA	DESCRIPTION	DEFAULT	MIN	MAX
0.0.10	Programmed set-point value		0000	9999

4.4.5 – VOLUMETRIC-COUNTER PARAMETER PROGRAMMING

To access this phase, set code SC05.

To modify the values, use the ADVANCE key.

The following data are programmed in the following order:

DATA	DESCRIPTION	DEFAULT	MIN	MAX
0020	Value in m ³ (cubic meters) of the quantity of water to be counted before regeneration.		0000	9999
AA14	Counter prescaler. Indicates how many impulses received from the cubic-meter counter probe correspond to one cubic meter deducted from the programmed total. This value may assume all of the values from 01 to 100 (in this case AA00 appears) and is expressed in impulses/cubic meter.	14	00	99
Ad01	Dosing Pump		00	99

4.4.6 – PASSWORD PROGRAMMING

To access this phase, set code SC07.

To modify the values, use the ADVANCE key.

The following data are programmed in the following order:

DATA	DESCRIPTION	DEFAULT	MIN	MAX
0000	Password. Used to prevent unauthorized people from modifying module programming. This code <u>MUST</u> be noted once it is set since it may only be cancelled by the manufacturer. As long as the code is 0000 to access programming, simply press the PROGRAM MODE key. If a code, a numerical value from 0001 to 9999, is set, the CODE key must be pressed, the code must be set using the ADVANCE key, and the CODE key must be pressed again before accessing programming.	0000	0000	9999

4.4.7 – TRANSFER OF NEWLY-PROGRAMMED VALUES

To access this phase, set code SC09.

After the code has been typed in, the display will again show the previously-displayed data and the new prescaler and cubic meter values will be transferred to the operation records without waiting for the completion of regeneration.

4.4.8 - FLAG PROGRAMMING

To access this phase, set code SC08. This is how the system's operation is programmed. Twenty-four flags are available: 8 dedicated to line A, 8 for line B, 2 common to the two lines, and 6 not used.

Use the ADVANCE key to modify the values. Flags set at 0 disable operation, flags set at 1 enable it.

FLAG	DESCRIPTION	
0At	Enables Super Automatic	LINE A
1At	Enables recirculation active during supply	
2At	Enables trip for set point	
3At	Enables trip for volume	
0bt	Enables drainage valve closing delay	
1bt	Enables commutation onto regeneration of A	
2bt	Enables parallel mode (valid for both lines)	
3bt	Selects conductivity reading scale 0 = 1 – 250 μ S; 1= 0.1 – 25.0 μ S	
0Ct	Enables exiting from last cycle on A set point	
1Ct	Not used	
2Ct	Not used	
3Ct	Not used	
0dt	Enables Super Automatic	
1dt	Enables recirculation active during supply	
2dt	Enables trip for set point	
3dt	Enables trip for volume	
0-t	Enables drainage valve closing delay	
1-t	Enables commutation onto regeneration of B	
2-t	Enables Support on set point (valid for both lines)	
3-t	Selects conductivity reading scale 0 = 1 – 250 μ S; 1= 0.1 – 25.0 μ S	
0tt	Enables exiting from last cycle on B set point	
1tt	Not used	
2tt	Not used	
3tt	Not used	

CHAPTER 5 - MAINTENANCE

5.1 PERIODIC MAINTENANCE

Check the state of the battery every 12 months.

To do so, turn off the module for 10 minutes. Then turn it on again and make sure that the board restarts with the values which were present on the display when it was turned off and that the values saved in EEPROM are not reloaded.

5.2 CORRECTIVE MAINTENANCE

5.2.1 FAILURE CONDITIONS

The board's most commonly-found failure condition is a non-effective battery: this condition occurs when the board, after carrying out the periodic maintenance procedure, restarts with the values saved in EEPROM.

Another failure condition is a blown main protection fuse located on the control panel.

Contact the retailer for any other failure condition not foreseen in the present document.

5.2.2 RESET OPERATIONS

Replace the battery.

Replace the fuse:

Unscrew the fuse holder cap, remove the blown fuse and replace it with a new one. Then reinsert the cap into the fuse holder and retighten.

5.2.3 VERIFICATION OF CORRECT OPERATION

Repeat the procedure described in par. 4.1.

Turn the system on again and verify operation. If the fuse blows again, try to disconnect all of the external connections from the module and replace the fuse again. If the fuse blows again, send the module to the retailer for repair. Otherwise, verify the system's various components.

5.3 LIST OF RECOMMENDED SPARE PARTS

1.6 AT Fuse

APPENDIX

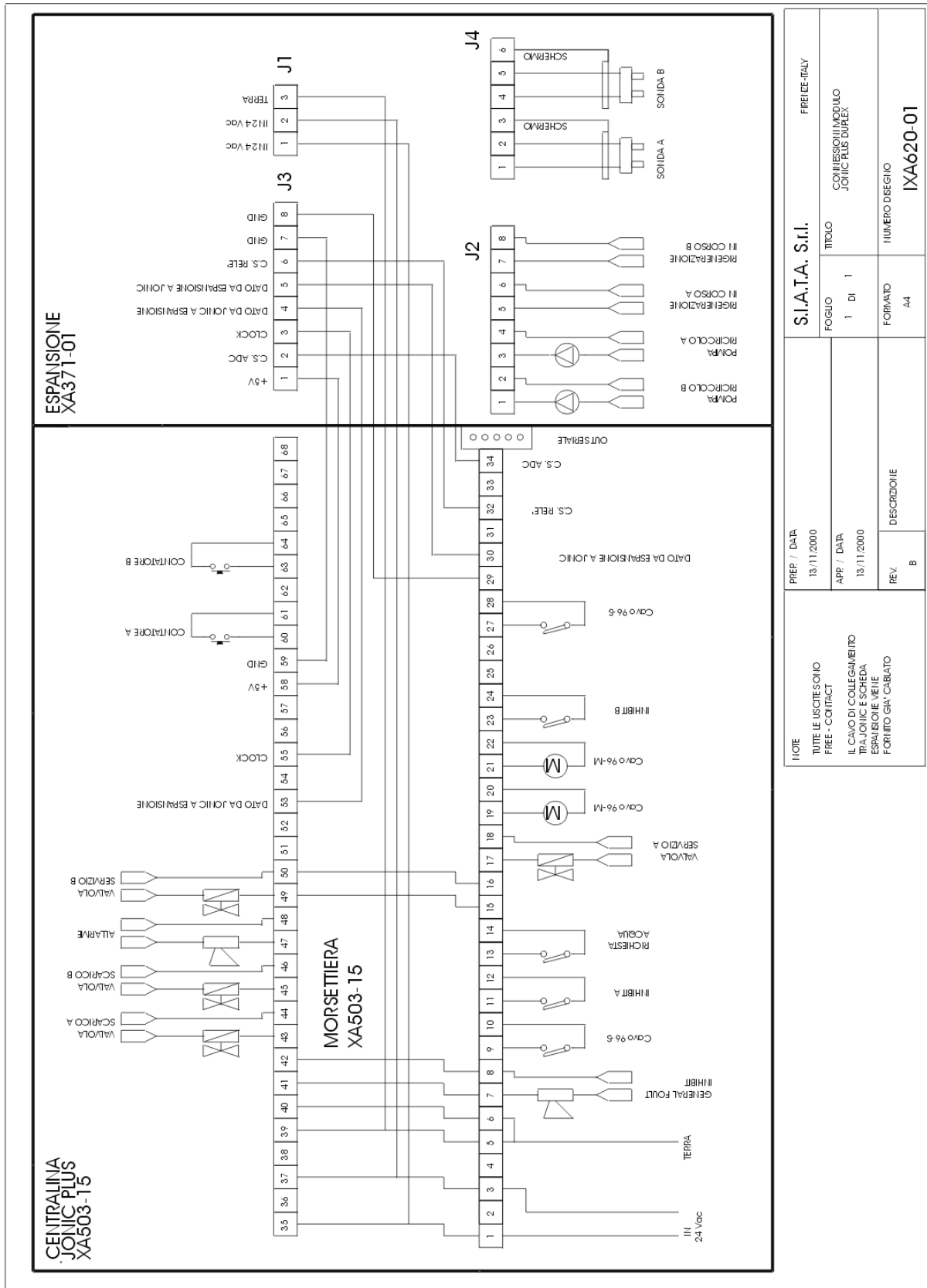
BRIEF OUTLINE FOR PROPER ACTIVATION OF THE MODULE

To properly operate the Aqua Ionic Plus Duplex 24 V module, the operator must program a series of data upon activation:

SC08	Programming of flags, module operation mode, and regeneration cycle startup mode (for details see paragraph 4.4.8).
SC01	Line A cycle data programming (for details see paragraph 4.4.1). Number of stops (min. 1 stop), duration of movement, and duration of various stop phases.
SC02	Line B cycle data programming (for details see paragraph 4.4.2). Number of stops (min. 1 stop), duration of movement, and duration of various stop phases.
SC03	Delays for conductivity alarm (for details see paragraph 4.4.3).
SC04	Set point value (for details see paragraph 4.4.4).
SC05	Data relating to volumetric counter (for details see paragraph 4.4.5). Water and prescaler quantity.
SC09	Reloading of counter values (for details see paragraph 4.4.7). Operation to be repeated <u>two times</u> , once for line A and once for line B.

The module will operate properly only if the reported data are programmed correctly. Otherwise, malfunctioning due to improper programming of the indicated parameters could occur.

Connection diagram



S.I.A.T.A. S.r.l.		FIRENZE-ITALY	
FOGLIO	1 DI 1	TITOLO	COLLESSIONI AL MODULO JONIC PLUS DUREX
REV.	B	DESCRIZIONE	
PREP. / DATA	13/11/2000	FORMATO	A4
APP. / DATA	13/11/2000	NUMERO DEGGIO	IXA620-01

NOTE
 TUTTE LE USCITE SONO FREE - CONTACT
 IL CAVO DI COLLEGAMENTO TRA JONIC E SCHEDE ESPANSIONE VIETIE FORNITO GIÀ CABLIATO

CENTRALINA JONIC PLUS XA503-15	JONIC PLUS XA503-15 CONTROL UNIT
VALVOLA SCARICO A	DRAINAGE VALVE A
VALVOLA SCARICO B	DRAINAGE VALVE B
ALLARME	ALARM
VALVOLA SERVIZIO B	SERVICE VALVE B
DATO DA JONIC A ESPANSIONE	DATA FROM JONIC TO EXPANSION MODULE
CONTATORE A	COUNTER A
CONTATORE B	COUNTER B
MORSETTIERA XA503-15	XA503-15 TERMINAL BOARD
TERRA	GROUND
GENERAL FOULT	GENERAL FAULT
Cavo	Cable
RICHIESTA ACQUA	WATER REQUEST
VALVOLA SERVIZIO A	SERVICE VALVE A
DATO DA ESPANSIONE A JONIC	DATA FROM EXPANSION MODULE TO JONIC
C.S. RELE'	C.S. RELAY
OUT SERIALE	SERIAL OUT
ESPANSIONE XA371-01	XA371-01 EXPANSION MODULE
POMPA RICIRCOLO B	RECIRCULATION PUMP B
POMPA RICIRCOLO A	RECIRCULATION PUMP A
RIGENERAZIONE IN CORSO A	REGENERATION IN PROGRESS A
RIGENERAZIONE IN CORSO B	REGENERATION IN PROGRESS B
SONDA A	PROBE A
SONDA B	PROBE B
SCHERMO	SHIELD
NOTE TUTTE LE USCITE SONO FREE - CONTACT IL CAVO DI COLLEGAMENTO TRA JONIC E SCHEDA ESPANSIONE VIENE FORNITO GIA' CABLATO	NOTES ALL OF THE OUTPUTS ARE FREE-CONTACT THE CONNECTION CABLE BETWEEN THE JONIC AND THE EXPANSION BOARD IS SUPPLIED ALREADY WIRED
DATA	DATE

DESCRIZIONE	DESCRIPTION
FOGLIO 1 DI 1	PAGE 1 OF 1
TITOLO CONNESSIONE MODULO JONIC PLUS DUPLEX	TITLE JONIC PLUS DUPLEX MODULE CONNECTION
FORMATO	SIZE
NUMERO DISEGNO	DRAWING NUMBER