SEQUENCE CONTROLLER

OPERATOR'S MANUAL – November 2008

LR 114135

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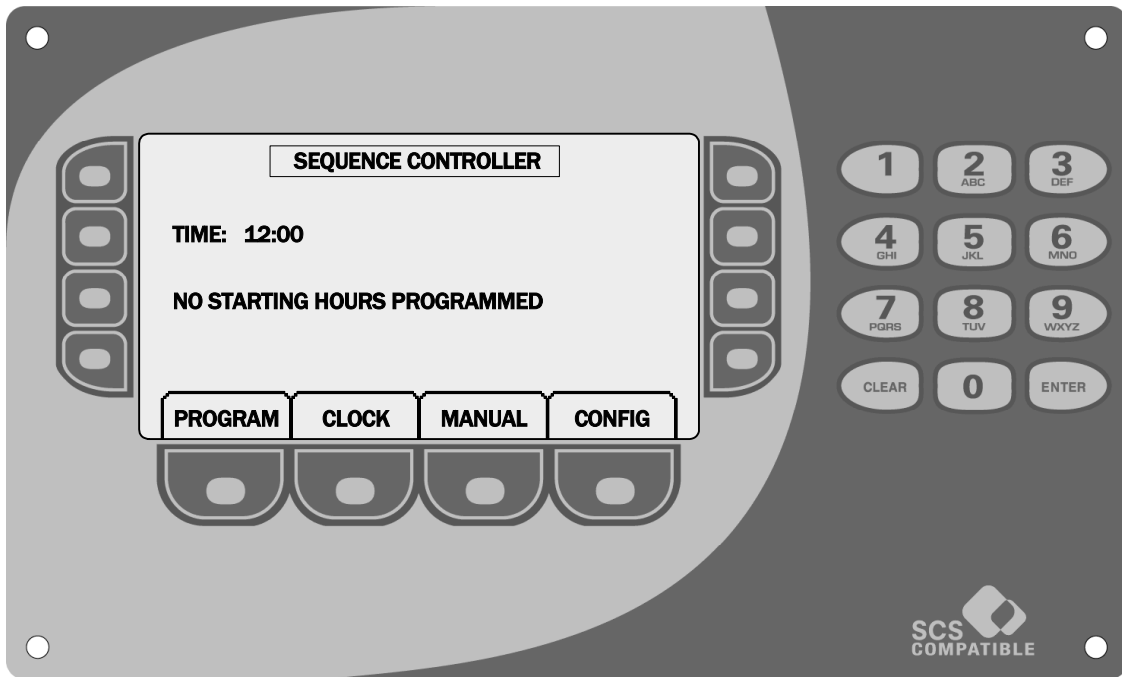
⚠ WARNING

Before connecting, programming and operating the Sequence controller panel, you must study and understand this OWNER'S MANUAL and become familiar with the operating procedures.

This symbol ⚠ identifies important safety information throughout this manual.

Failure to follow this warning could result in damages to the equipment and / or serious injuries.

1. Always turn the power off at the installation main entry before wiring the control panels, the motors and their related components.
2. Always turn the power off before repairing or servicing the equipment.
3. Install a ground wire on each electrical equipment of the system.
4. Make sure the ground wire is connected inside each control panel.
5. Keep away from moving parts.
6. Do not remove machine guards at any time.
7. Read, understand and keep all safety stickers in place.

Table of contents

1. BASIC FUNCTIONALITY

1.1. THE MAIN SCREEN

Figure 1 shows the main screen. Important messages are printed here. For example, to be sure that an automatic start will be executed, verify this screen, the next start time will be printed and a button will permit the user to verify which sequence will be executed. Also, if an alarm has occurred on one or more outputs, a message will be printed in the main screen and a button will permit the user to verify the time of each alarm and to reset the alarms. The main screen will automatically appear after 30 seconds of inactivity and is accessible from almost every screen and every sub-menu by pressing MAIN. The RUNNING screen replaces the main screen when an output or sequence is running.
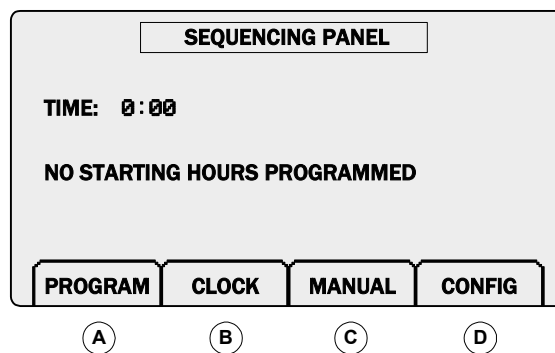
Figure 1 : MAIN Screen

1.2. USING THE MAIN MENU

Buttons A to D from Figure 1 represent the main menu tabs. This menu can be accessed from almost any screen. When one of these keys is pressed a sub-menu opens. Pressing a second time on a menu closes the sub-menu. The four sub-menus are illustrated in figures 1-A to 1-D.
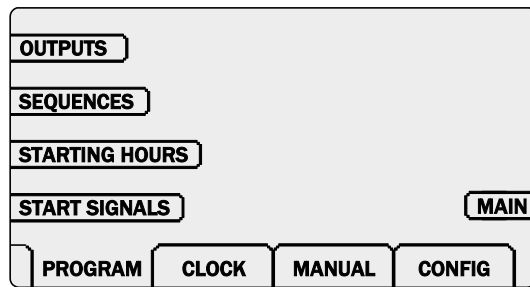
Figure 1-A: PROGRAM sub-menu
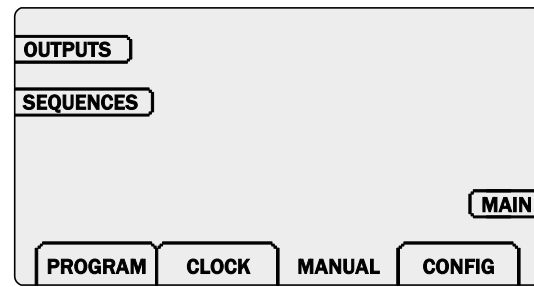
Figure 1-C: MANUAL sub-menu
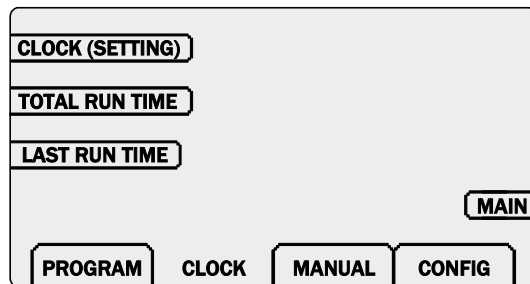
Figure 1-B: CLOCK sub-menu
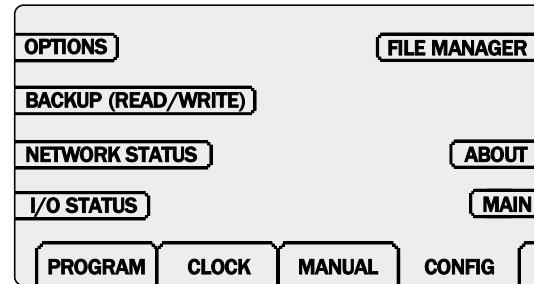
Figure 1-D: CONFIG sub-menu

1.3. CHANGING THE LANGUAGE

1 From any screen, press the CONFIG menu and press OPTIONS from the sub-menu (figure 1-D).

2 In the OPTIONS screen, press the key next to the LANGUE/LANGUAGE option to toggle between English and French.

1.4. CHANGING THE TIME

1 From any screen, press the CLOCK menu and press CLOCK (SETTING) from the sub-menu (figure 1-B).

2 In the CLOCK SETTING screen, press the key next to TIME and enter the time using the keypad. Clock values are between 0:00 (midnight) and 23:59.

2. PROGRAMMING THE OUTPUTS

1 From any screen, press the PROGRAM menu and press OUTPUTS from the sub-menu (figure 1-A).
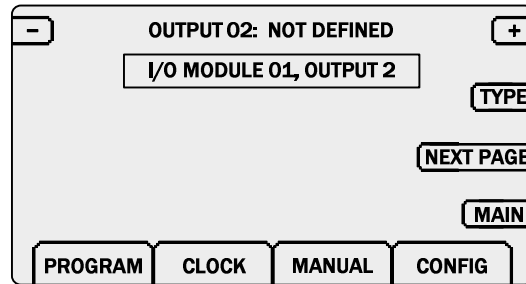
Figure 2 : Outputs programming screen 1

2 Choose the output to program by using the + and - keys (Figure 2). Note that the physical location of the output is indicated in the rectangle below the output identification.

3 Press TYPE.
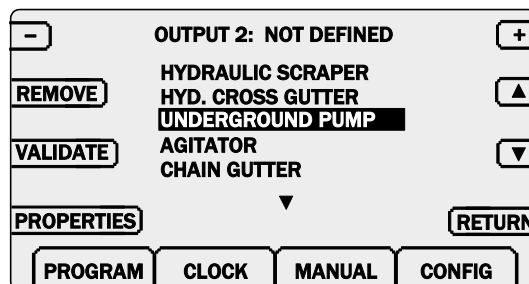
Figure 3 : Type selection screen

4 Choose the type of output by scrolling the list with the ▲ and ▼ keys (Figure 3) and press VALIDATE. Other outputs may also be programmed by changing the output number with the +/- keys. If your type of machinery is not in the list, refer to section 3 (page 7).

NOTE: Pressing VALIDATE loads the default configuration from the chosen type of output. If the output has already been programmed, user settings will be lost.

5 Press the RETURN key to return to the outputs programming screen. The MIN and MAX (or RUN) times will be set at their default values for the chosen type of output.   Figures 4 and 5 illustrate the two programming screens which are accessed by pressing the NEXT PAGE / PREV PAGE keys. Below is the explanation for each setting of an output. Some settings are only available for certain types of outputs (pumps do not have any settings). Table 1 (page 6) contains the default settings for each type of output.

```
┌─────────────────────────────────────┐
│ ┌─┐   OUTPUT 02: HYDRAULIC SCRAPER ┌─┐│
│ └─┘                               └+┘│
│                                      │
│ ▷ MIN TIME:      0:00 (M/S)  ┌─────┐ │
│                              │TYPE │ │
│                              └─────┘ │
│ ▷ MAX TIME:      0:00 (M/S) ┌──────────┐│
│                             │NEXT PAGE ││
│                             └──────────┘│
│ ▷ PUMP:  00                  ┌─────┐ │
│                              │MAIN │ │
│                              └─────┘ │
│ ┌───────┬──────┬──────┬────────┐    │
│ │PROGRAM│CLOCK │MANUAL│ CONFIG │    │
│ └───────┴──────┴──────┴────────┘    │
└─────────────────────────────────────┘
```

Figure 4: Outputs programming screen 1

```
┌─────────────────────────────────────┐
│ ┌─┐   OUTPUT 02: HYDRAULIC SCRAPER ┌─┐│
│ └─┘                               └+┘│
│                                      │
│ ▷ START DELAY:  0:00 (M/S)  ┌─────┐ │
│                             │TYPE │ │
│                             └─────┘ │
│ ▷ SEQUENCE ALARM           ┌──────────┐│
│                            │PREV PAGE ││
│                            └──────────┘│
│                             ┌─────┐  │
│                             │MAIN │  │
│                             └─────┘  │
│ ┌───────┬──────┬──────┬────────┐    │
│ │PROGRAM│CLOCK │MANUAL│ CONFIG │    │
│ └───────┴──────┴──────┴────────┘    │
└─────────────────────────────────────┘
```
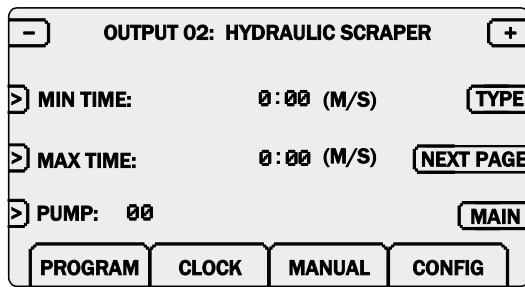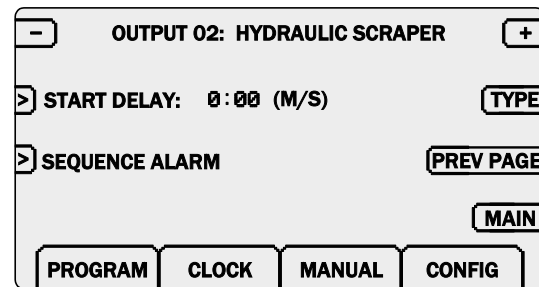
Figure 5: Outputs programming screen 2

MIN TIME

This is the amount of time the output must run without taking account of the input signal, preventing the output to be stopped during this time. The minimum time is not added to the MAX / RUN TIME, both timers are activated simultaneously with the output.

MAX / RUN TIME

Depending on the type of output this will be MAX or RUN TIME:

- In maximum mode, if the maximum time is reached without receiving the input signal, the output will be put in an alarm state (off) and a message will appear. The output and/or all sequences (depending on the alarm mode for that output, see sequence/output alarm) will not run until the alarm is reset.

- In run mode, the output will run during this time or until the input signal is received. If the run time is reached without receiving the input signal, the output will simply turn off without any alarm.

PUMP

Only accessible for certain types of outputs. Pressing this key will open a list of programmed pumps (if any) to choose from for that particular output. Outputs must first be programmed as pumps by following steps 1 to 4 of this section and choosing MASTER PUMP as the type. The pump output will always be activated 2 seconds before activating the hydraulic output and keep running 2 seconds after deactivating the hydraulic output.

START DELAY

Entering a time will cause a delay before activating an output when used in a sequence (there is no delay when manually starting an output). This can be useful when two or more outputs must run simultaneously in a sequence but activated at different moments.

NOTE: The MIN TIME and MAX / RUN TIME are not affected by this delay, they will only increment while the output is running and not during the delay. The START DELAY must not be considered when programming these times.

SEQUENCE/OUTPUT ALARM

This option is only accessible when in MAX TIME mode and is set to SEQUENCE ALARM by default. By changing this to OUTPUT ALARM, a maximum time alarm on that output will not cause a system halt. In the case of an alarm caused by a maximum run time, the next outputs in the sequence will be activated despite the alarm and the system will continue running normally by ignoring the faulted output. An alarm message will appear in the main screen and the faulted output will not run again until the alarm is manually reset.

NOTE: A pump alarm will always cause a system halt despite of this option.

Table 1: Default values for output types

Type	Minimum time (MM:SS)	Maximum/Run time (MM:SS)	Maximum or Run	Pump: Yes / No
HYDRAULIC SCRAPER	00:20	01:00	Max	Yes
HYD. CROSS GUTTER	00:00	01:00	Run	Yes
UNDERGROUND PUMP	05:00	07:00	Max	Yes
AGITATOR	00:00	01:00	Run	No
CHAIN GUTTER	00:00	01:00	Run	No
FLUSH VALVE	00:00	00:15	Run	Yes
TRANSFER PUMP	00:00	01:00	Run	No

3. CREATING A NEW TYPE OF OUTPUT

If your type of machinery is not present in the list (see Figure 3, page 4), you may create up to two new types by following these steps. More than one output can be configured to use the new type. Note that it is normally not necessary to create new types for most systems.

1 Follow steps 1 to 3 from section 2 (page 4). From the type selection screen (Figure 3), choose one of two NOT DEFINED outputs and press the PROPERTIES key.
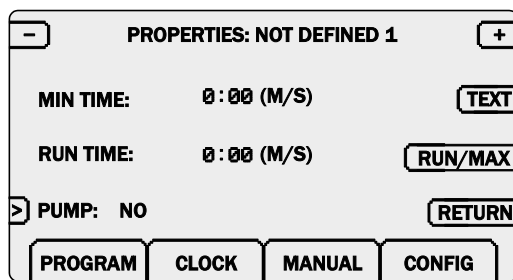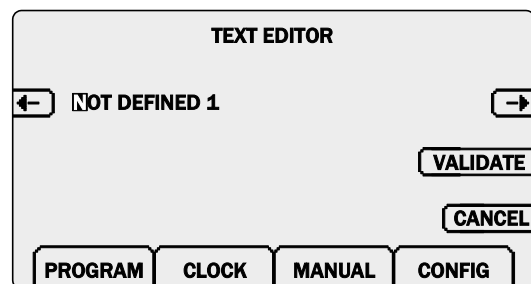

Figure 6: Property settings for a type of output

Figure 7: Text editor

2 If this type of output uses a pump, press the PUMP key to toggle from NO to YES, this will permit addressing a pump to the outputs using this type.

3 Press the RUN/MAX key to toggle between RUN TIME and MAX TIME. See section 2 for the RUN/MAX functionality.

4 To modify the text for this type of output press the TEXT key (**Figure 6**). Entering a letter is done by rapidly pressing the corresponding key the number of times equivalent to the position of the letter on that key. Ex.: to enter 'E', the number 3 on the keypad must be pressed two times (do not wait between each keystroke or the cursor will automatically advance). After entering a new letter, the cursor will advance after 2 seconds or it will immediately advance if a different key is pressed. Press CLEAR to erase a single letter and use the arrows to move the cursor in the text. Press VALIDATE (**Figure 7**) to accept the changes and return to the previous screen or CANCEL to return to the previous screen without changing the text (only if ENTER on the keypad has not been pressed).

5 From the properties screen, press the RETURN key and continue with step 4 from section 2 (page 4).

4. PROGRAMMING THE SEQUENCES

A sequence is a series of outputs to be run sequentially and/or simultaneously. Once programmed, a sequence can be executed manually or automatically by programming starting hours (see section 5, page 9) or start signals (see section 0, page 10).

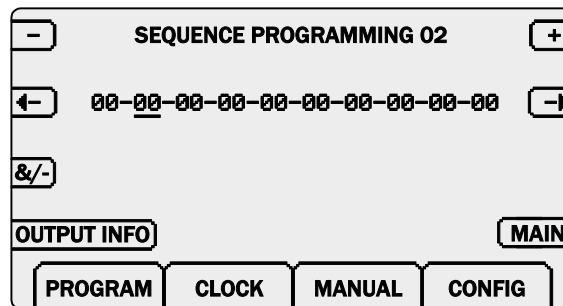**1** From any screen, press the PROGRAM menu and press SEQUENCES from the sub-menu (Figure 1-A).

```
┌─────────────────────────────────────────────┐
│ ┌──┐    SEQUENCE PROGRAMMING 02      ┌──┐    │
│ │ ─│                                 │ +│    │
│ └──┘                                 └──┘    │
│ ┌──┐                                 ┌──┐    │
│ │←─│  00-00-00-00-00-00-00-00-00-00  │─→│    │
│ └──┘                                 └──┘    │
│ ┌────┐                                       │
│ │&/- │                                       │
│ └────┘                                       │
│ ┌──────────┐                    ┌──────┐     │
│ │OUTPUT INFO│                   │ MAIN │     │
│ └──────────┘                    └──────┘     │
│ ┌────────┐┌───────┐┌────────┐┌────────┐      │
│ │PROGRAM ││ CLOCK ││ MANUAL ││ CONFIG │      │
│ └────────┘└───────┘└────────┘└────────┘      │
└─────────────────────────────────────────────┘
```

Figure 8: Sequence programming screen

2 Up to 10 sequences can be programmed, each containing a maximum of 10 outputs. The sequence is chosen with the + and - keys (Figure 8). The sequence will execute from left to right, use the two arrows to move the cursor along the sequence.

3 Enter the number of the output to be executed with the keypad or use the OUTPUT INFO key to view the output settings and insert an output into the sequence (the output in the OUTPUT INFO screen can be selected by using the + and – keys).

4 A "-" between the outputs indicates that the next output will not be executed until the previous has completely finished running. A "&" indicates that the outputs will run simultaneously. Press the "&/-" key (Figure 8) to change the symbol between two outputs. Pumps should not be entered in a sequence; they will be ignored. Pumps are automatically started when programmed as a pump and setup in the PUMP setting of an output (see section 2, page 4).

NOTE: Zeros, pumps and undefined outputs in a sequence are ignored, for example; if 1&2&0&0&3 is programmed, outputs 1,2 and 3 will all run simultaneously. But if 1&2&0-0&3 is programmed, only outputs 1 and 2 will run simultaneously, then output 3 will run alone (outputs 1 AND 2 will be completed before executing output 3).

5. AUTOMATIC STARTING HOURS

5.1. PROGRAMMING AUTOMATIC STARTING HOURS

1 From any screen, press the PROGRAM menu and press STARTING HOURS from the sub-menu (figure 1-A).

```
┌─┐      PROGRAM SETTINGS 02      ┌─┐
│ - │                            │ + │
└─┘                              └─┘
 ┌┐                              ┌──────┐
 │>│ STARTING HOUR:  8:00        │DELETE│
 └┘                              └──────┘
 ┌┐
 │>│ SEQUENCE:        1
 └┘
┌───────────┐                    ┌────┐
│SEQUENCE INFO│                   │MAIN│
└───────────┘                    └────┘
┌────────┬────────┬────────┬────────┐
│PROGRAM │ CLOCK  │ MANUAL │ CONFIG │
└────────┴────────┴────────┴────────┘
```
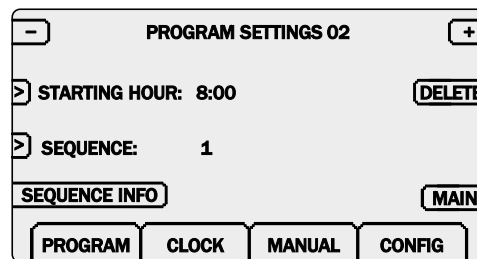
Figure 9 Starting hours programming screen

2 Up to 24 automatic starting hours can be programmed. Use the + and – keys (Figure 9) to choose an automatic start. Press the STARTING HOUR key and enter the time with the keypad.

NOTE: Possible hours are 0:00 (Midnight) to 23:59.

3 Press the SEQUENCE key and enter a sequence (1-10) with the keypad or press SEQUENCE INFO, select a sequence with the + and – keys and press the INSERT key.

5.2. DELETING AUTOMATIC STARTING HOURS

1 From any screen, press the PROGRAM menu and press STARTING HOURS from the sub-menu (Figure 1-A).

2 Use the + and – keys (**Erreur ! Source du renvoi introuvable.**) to choose an automatic start.

3 If an hour is programmed a DELETE key will appear. Pressing delete will remove the starting hour.

6. START SIGNALS

6.1. PROGRAMMING START SIGNALS

A start signal is an exterior electrical signal (ex. from a start button) connected to one of the inputs. One or more inputs can be programmed to execute different sequences when a start signal is received.

NOTE: When an input is used for this purpose the equivalent output cannot be used.

1 From any screen, press the PROGRAM menu and press START SIGNALS from the sub-menu (figure 1-A).
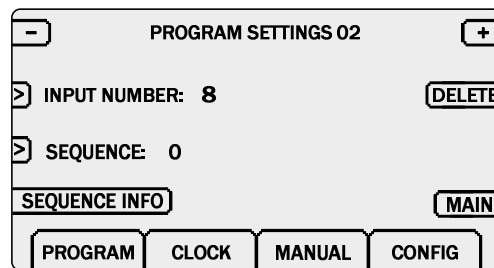
```
 ┌─────────────────────────────────────┐
 │ ─   PROGRAM SETTINGS 02      +       │
 │                                      │
 │ > INPUT NUMBER:  8        DELETE     │
 │                                      │
 │ > SEQUENCE:   0                      │
 │                                      │
 │ SEQUENCE INFO              MAIN      │
 │ PROGRAM   CLOCK   MANUAL   CONFIG    │
 └─────────────────────────────────────┘
```

Figure 10 Start signals programming screen

2 Up to 8 start signals can be programmed. Use the + and – keys (Figure 10) to choose a program setting (1 to 8). Press the INPUT NUMBER key and enter the number of the input with the keypad.

3 Press the SEQUENCE key and enter a sequence (1-10) with the keypad or press SEQUENCE INFO, select a sequence with the + and – keys and press the INSERT key.

6.2. DELETING A START SIGNAL

1 From any screen, press the PROGRAM menu and press START SIGNALS from the sub-menu (figure 1-A).

2 Use the + and – keys (Figure 10) to choose a program setting.

3 If an input is programmed a DELETE key will appear. Pressing delete will remove the start signal.

7. MANUAL MODES

7.1. MANUALLY STARTING AN OUTPUT

1 From any screen, press the MANUAL menu and press OUTPUTS from the sub-menu (figure 1-C).

2 Choose the output with the + and – keys.

3 Press the START key. The output must have been programmed, follow section 2 (page 4) to program an output. Pumps can also be manually started.

NOTE: There's no START DELAY in manual mode.

7.2. MANUALLY STARTING A SEQUENCE

1 From any screen, press the MANUAL menu and press SEQUENCES from the sub-menu (figure 1-C).

2 Choose the sequence with the + and – keys.

3 Press the START key to execute the sequence once or CONTINUOUS RUN to continually execute the sequence until STOP or LAST SEQUENCE is pressed. STOP will immediately stop the sequence while LAST SEQUENCE will complete the running sequence before stopping.

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8. STOPPING A RUNNING OUTPUT OR SEQUENCE

An output or sequence can be stopped by pressing the STOP key from the RUNNING screen. If in another screen, return to the main screen to access the STOP key. It is possible to prevent automatic starts by setting the AUTOMATIC STARTS option to OFF: choose OPTIONS in the CONFIG menu (Figure 1-D).

9. BACKUP AND RETRIEVE SETTINGS

9.1. SAVING PROGRAMMED SETTINGS

After programming the sequencer, a BACKUP of all the settings can be made in order to reinitialize the controller in the exact state it was in at the moment of the backup. This can be useful in the case where undesired changes to the settings our made or data has been lost or corrupted. Power outages will normally not cause the loss of data.

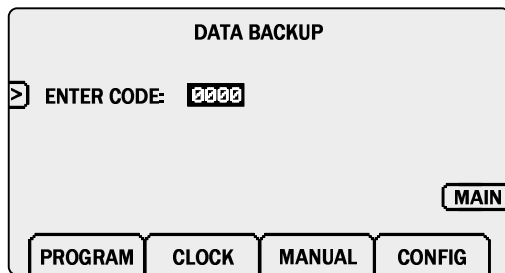1) From any screen, press the CONFIG menu and press BACKUP from the sub-menu (Figure 1-D).

DATA BACKUP

> ENTER CODE: 0000

MAIN

| PROGRAM | CLOCK | MANUAL | CONFIG |

Figure 11 Data backup main screen

DATA BACKUP

> ENTER CODE: 0000

> RETRIEVE DATA

> BACKUP DATA
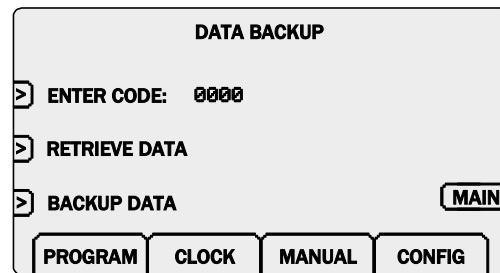
MAIN

| PROGRAM | CLOCK | MANUAL | CONFIG |

Figure 12 Data backup main screen 2

2) In order to protect the backup, a code must be entered. The default code is 7444, this can be changed or deactivated from the OPTIONS sub-menu. Enter the code and press ENTER on the keypad (Figure 12).

3) If the code is correctly entered the options RETRIEVE DATA and BACKUP DATA should appear (Figure 12). Press the BACKUP DATA key.
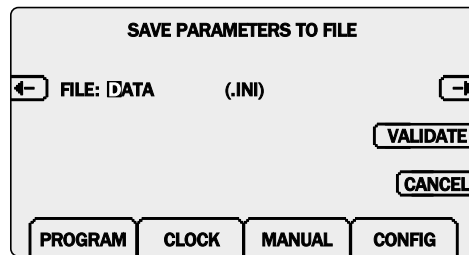
Figure 13 File Name

4) Enter the file name for the settings, the file extension (.INI) will automatically be added. If the file exists, it will be replaced, if it does not exist, it will be created. A maximum of 32 files can be created. Entering a letter is done by rapidly pressing the corresponding key the number of times equivalent to the position of the letter on that key. Ex.: to enter 'E', the number 3 on the keypad must be pressed two times (do not wait between each keystroke or the cursor will automatically advance). After entering a new letter, the cursor will advance after 2 seconds or it will immediately advance if a different key is pressed. Press CLEAR to erase a single letter and use the arrows to move the cursor in the text. Press VALIDATE to save the settings and return to the previous screen or CANCEL to return to the previous screen without changing the text (only if ENTER on the keypad has not been pressed).

NOTE 1: Do not backup data while system is running.

NOTE 2: Saving data may take a couple of minutes, do not turn off power during this operation.

9.2. RETRIEVING PROGRAMMED SETTINGS

Retrieving programmed settings can only be done if a backup of the data has already been executed (see section 9.1). This will put the system in the exact state it was in when the data was saved.

1) From any screen, press on the CONFIG menu and choose BACKUP from the sub-menu (Figure 1-D).

2) In order to protect the backup and retrieve of data, a code must be entered. The default code is 7444, this can be changed or deactivated from the OPTIONS sub-menu. Enter the code and press ENTER on the keypad (Figure 12).

3) If the code is correctly entered the options RETRIEVE DATA and BACKUP DATA should appear (Figure 13). Press the RETRIEVE DATA key.
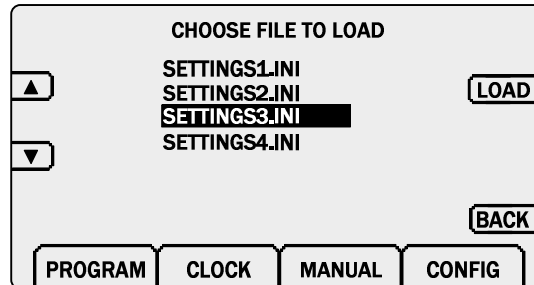
④ Press FROM FILE.

Figure 14 Data retrieve from file

⑤ Choose the desired file with the arrows and press LOAD, to load the settings or BACK to cancel.

NOTE 1: Do not load data while system is running.

NOTE 2: Loading data may take a couple of minutes, do not turn off power during this operation.

9.3. REINITIALIZING TO DEFAULT SETTINGS

Resetting the systems memory will cause the controller to be in its default state, **all programmed settings will be lost** (backup files will not be lost and retrieving these settings will be possible, see sections 9.1 and 9.2).

① From any screen, press on the BACKUP menu and press CONFIG from the sub-menu (Figure 1-D).

② In order to protect the backup and retrieve of data, a code must be entered. The default code is 7444, this can be changed or deactivated from the OPTIONS sub-menu. Enter the code and press ENTER on the keypad (Figure 12).

③ If the code is correctly entered the options RETRIEVE DATA and BACKUP DATA should appear (Figure 13). Press the RETRIEVE DATA key.

④ Press the FACTORY DEFAULTS key. Loading data may take a couple of minutes.

NOTE 1: Do not load data while system is running.

NOTE 2: Loading data may take a couple of minutes, do not turn off power during this operation.

10. TROUBLESHOOTING

10.1. NETWORK

All inputs and outputs are connected to the system by a network. To verify that all modules are connected and functional, choose NETWORK STATUS from the CONFIG menu (Figure 1-D).
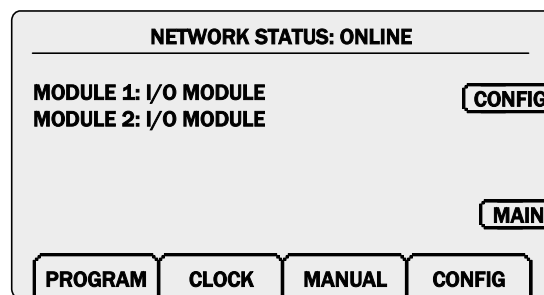
NETWORK STATUS: ONLINE

MODULE 1: I/O MODULE
MODULE 2: I/O MODULE

CONFIG

MAIN

| PROGRAM | CLOCK | MANUAL | CONFIG |

Figure 15 Network Status

The Network Status screen (Figure 15), displays the states of the network and the modules. All the modules should be listed. If the type of module appears, the module is functional.

Network Alarm: A network alarm will stop a working sequence if a network fault occurs while an output from that module is activated. Press the RESET button and verify the Network Status. If the fault has been corrected the network will automatically reconnect.

10.2. INPUT/OUTPUT STATUS

A good way of verifying that the system is functioning properly is to validate each input and output status. Press CONFIG, and choose NETWORK STATUS from the sub-menu (Figure 1-D).
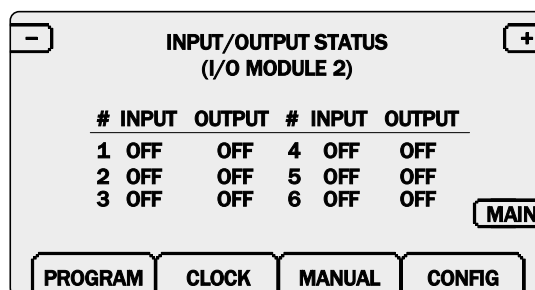
INPUT/OUTPUT STATUS
(I/O MODULE 2)

#	INPUT	OUTPUT	#	INPUT	OUTPUT
1	OFF	OFF	4	OFF	OFF
2	OFF	OFF	5	OFF	OFF
3	OFF	OFF	6	OFF	OFF

MAIN

| PROGRAM | CLOCK | MANUAL | CONFIG |

Figure 16 Input/output Status

2070, Joseph St-Cyr · Drummondville, QC, Canada · J2C 8V6 · Telephone: (819) 474-4635 · Fax: (819) 474-5013 · www.jpselectronique.com