TELEMARK

MODEL 390
SIX CRYSTAL CONTROLLER

INSTRUCTION MANUAL

Software version 0.6

February 2018

telemark.com

Current version of this manual can be found at
https://telemark.com/quartz-crystal-control/six-crystal-sensors/

WARRANTY

The 390 Six Crystal Controller is guaranteed against faulty materials, function and workmanship for a period of 12 months after delivery from Telemark. Components which are purchased by Telemark from other manufacturers will be guaranteed for any lesser time that such manufacturer warrants its products to Telemark. This warranty is valid only for normal use where regular maintenance is performed as instructed. This warranty shall not apply if repair has been performed or an alteration made by anyone other than an authorized Telemark representative or if a malfunction occurs through abuse, misuse, negligence or accident. No charge will be made for repairs made under warranty at Telemark's facilities. Freight costs both ways will be at customer's expense. Telemark reserves the right for final warranty adjustment.

USER RESPONSIBILITY

The user is responsible for proper operation and ordinary maintenance of the equipment, following procedures described in this manual, including reference documents. Proper operation includes timely replacement of parts that are missing, broken or plainly worn. If the user has a reasonable doubt about understanding the use or installation of a component, Telemark Technical Service should be called.

It is vitally important that the user properly install the equipment as described in Chapter 3 (Installation) of this manual. The warranty will be void if the equipment is improperly installed.

Alteration of the design or any function of the equipment voids the warranty and is entirely the responsibility of the user.

SAFETY WARNING

General Precautions: Human contact with the voltages present within the power supply and vacuum system can be fatal. Make sure that the input power is turned off before opening the doors or removing panels. Short all HV feedthroughs connections with a grounding hook before accessing the Six Crystal Controller main body.

CHANGE LOG

0.6

Changed

Current version

TABLE OF CONTENTS

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UNPACKING

Your Model 390 Six Crystal Controller is packed into a specially designed double strength box surrounded with rigid foam padding.

Since packaging the Six Crystal Controller for safe shipment is otherwise difficult, please save the box in the event that the Six Crystal Controller may ever need to be returned for servicing.

We cannot be held liable and may not be able to fix without charge Six Crystal Controllers which are damaged in transit as a result of improper packaging.

Contents of shipping box:

- Six Crystal Controller mechanism
- Controller
- Power cord
- Motor cable
- Control cable

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DESCRIPTION

The indexer positions the sensors of a turret-type rotators, it also has a position-indicating function. The Indexer features a high torque motor. It is equipped with a coupling to accommodate a feedthrough drive shaft of a ¼ inch (6.35mm).

The 390 Six Crystal Controller's most notable features are the following:

1 - Selects, accurately positions, and indicates sensor identification.

2 - Other features, such as heavy-duty screws in all important fastening locations, and heavy-duty construction all round, are designed to make the indexer serviceable for years of production.

3 - Remote operation from a PLC (Programmable Logic Control).

4 - Can be tied to the high voltage interlock on the power supply.

5 - Ground stud, to ground the indexer from shorts.

● Color LCD touch screen for graphical and numerical display, providing an intuitive and user-friendly operator interface

● Remote crystal selected by optically isolated inputs, up to 6 direct or binary (software selectable active or passive)

● Relay isolated outputs In position up to 6 crystals

Specifications

Number of crystals: 6

Controller dimensions: 19-inch rack 2U, 3 1/2" high x 9 3/8" deep

Inputs: 8 optically isolated, active (4 to 24V DC or AC), or passive (contact closure)

Outputs: 8 relay contacts NO/NC @ max 1A, 24 DC or AC
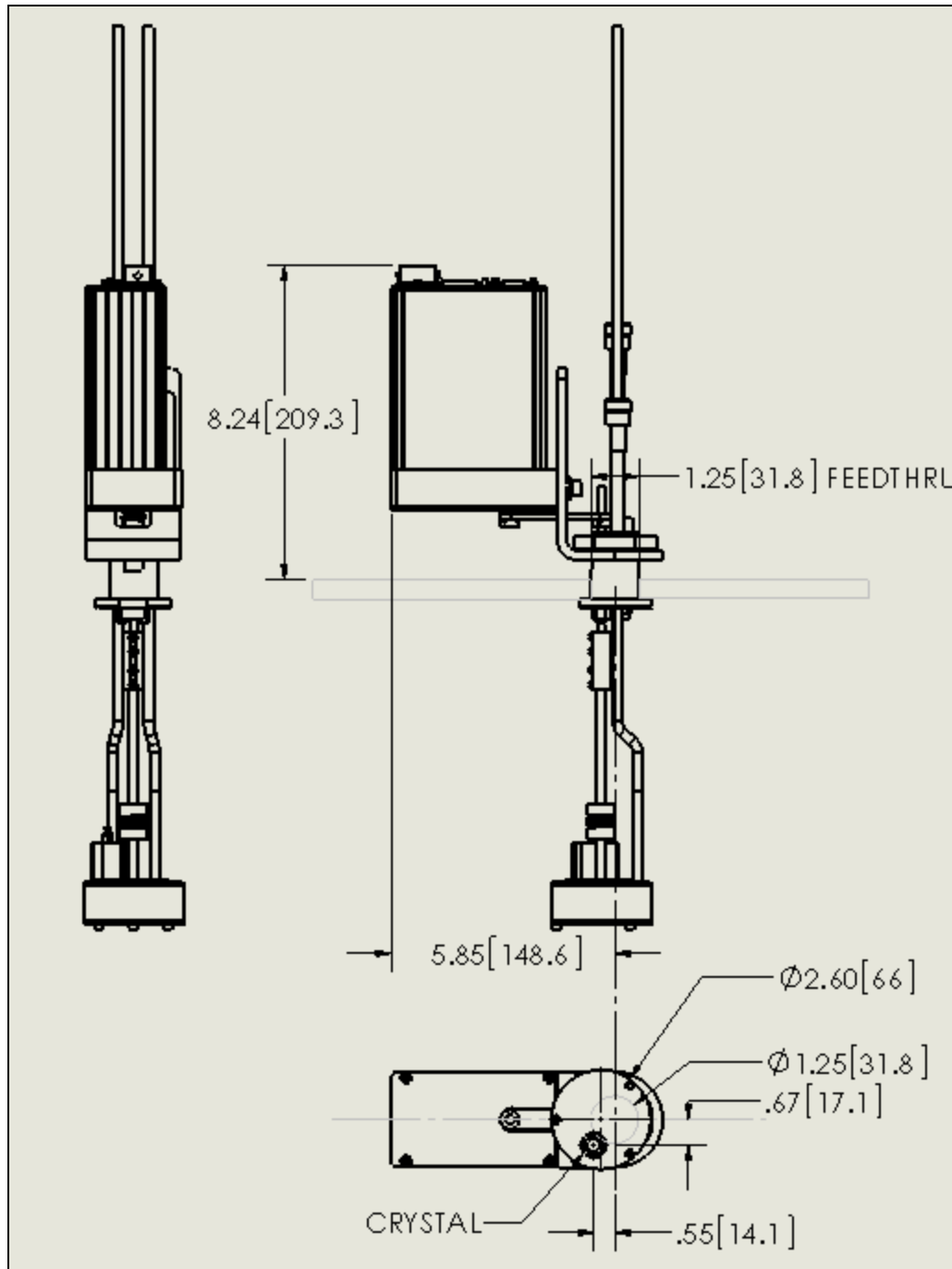
Power Input: 90-260VAC, 50-60 Hz

Figure 2-A   Motor Assembly Reference Dimensions

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INSTALLATION

Required components

The following is the minimum list of components required for setting up the Six Crystal Controller for safe operation.

- Vacuum system with adequate external room for Six Crystal Controller mounting.

- 19-inch rack with 115/230VAC, 50/60 Hz power to house the controller.

- Cable from ground on chamber to ground stud Six Crystal Controller.

Setting Up

There are many different ways to set up the Six Crystal Controller. The best location and drive connection for your application can only be made after analyzing all the factors. A 1-1/4 inch feedthrough hole in the top of the chamber is needed to mount the assembly.
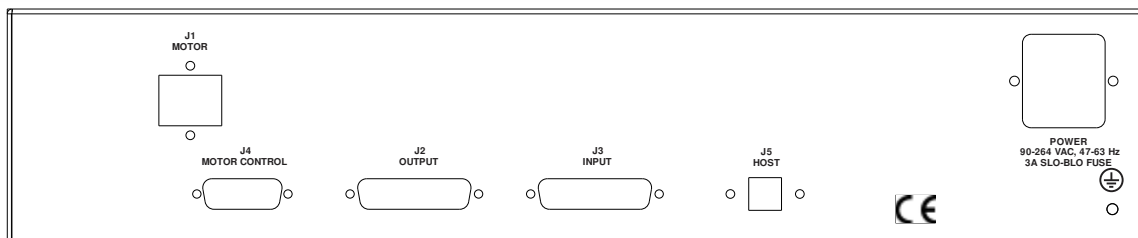

Figure 3-A Rear Chassis

Motor Cables

J1 (Motor) on the chassis goes to J1 on the Motor Assembly.

J4 (Motor Control) on the chassis goes to J2 on the Motor Assembly.

Inputs - J3

Inputs are software selectable to be active or passive from the configuration screen.

Passive TTL level inputs activated by a short across input pins.

Active inputs activated by 12 to 24 volts DC across the input pins.

The optically isolated input 25 pin female connector on the back of 396/398 indexer controls the following:

1. Remote pocket selection, up to 6 pockets directly and up to 30 pockets using binary code

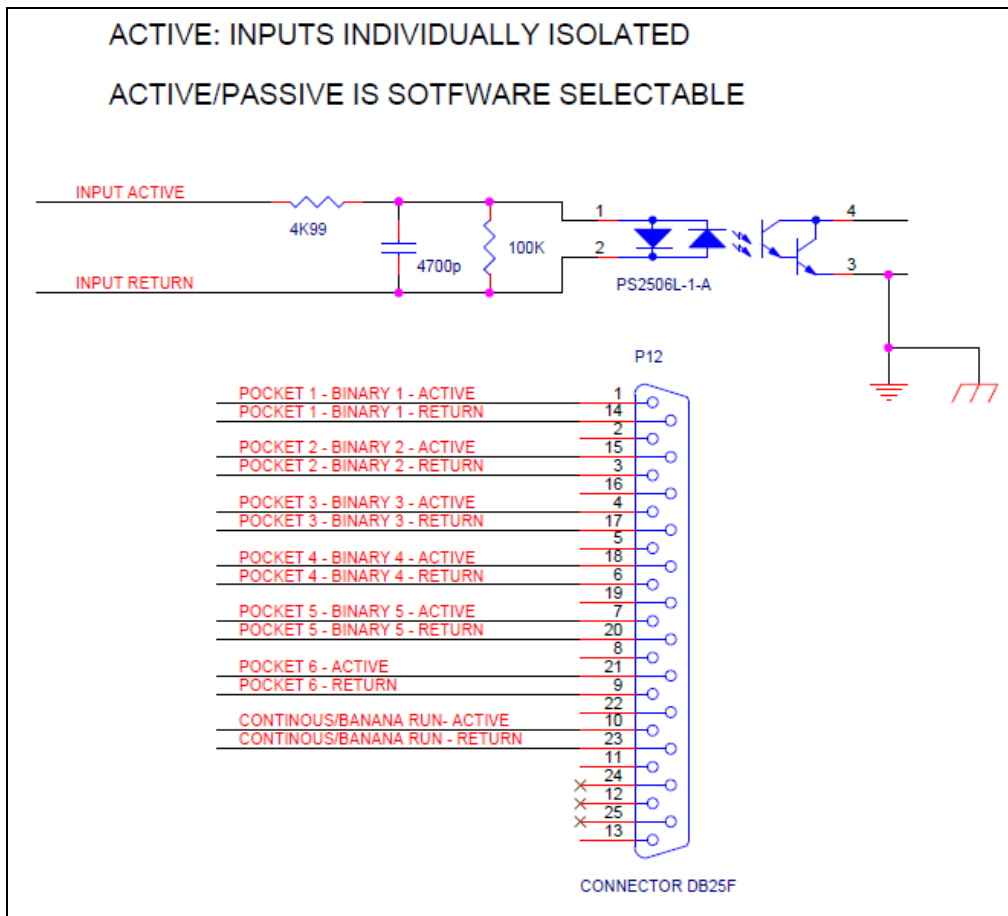2. Remote control start/stop of the continuous/banana rotation
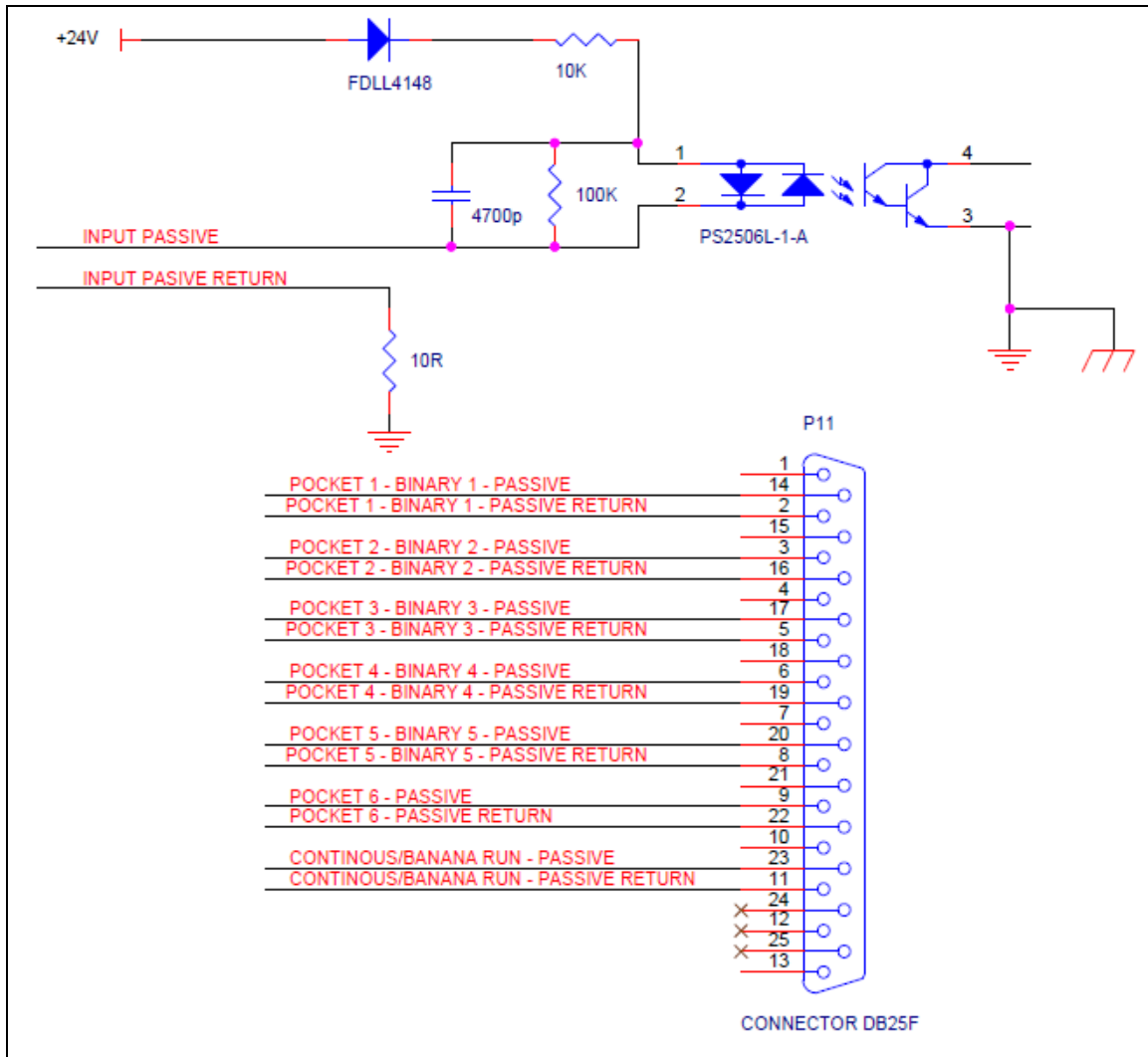

Figure 3-B   Active Input Connections

Figure 3-C   Passive Input Connections

Outputs – J2

The outputs are on a 25-pin male connector on the back of 390, isolated SPST relays, 50VDC max, 2A max.

Outputs are:

1. **Crystal signal,** 6 crystals directly or us binary.

2. **Remote Mode signal**, signal when the Six Crystal Controller is in remote mode.

3. **In position signal**, when the motor has stopped when the crystal is in position.

4. **Error signal,** when there is an error such as a motor jam.
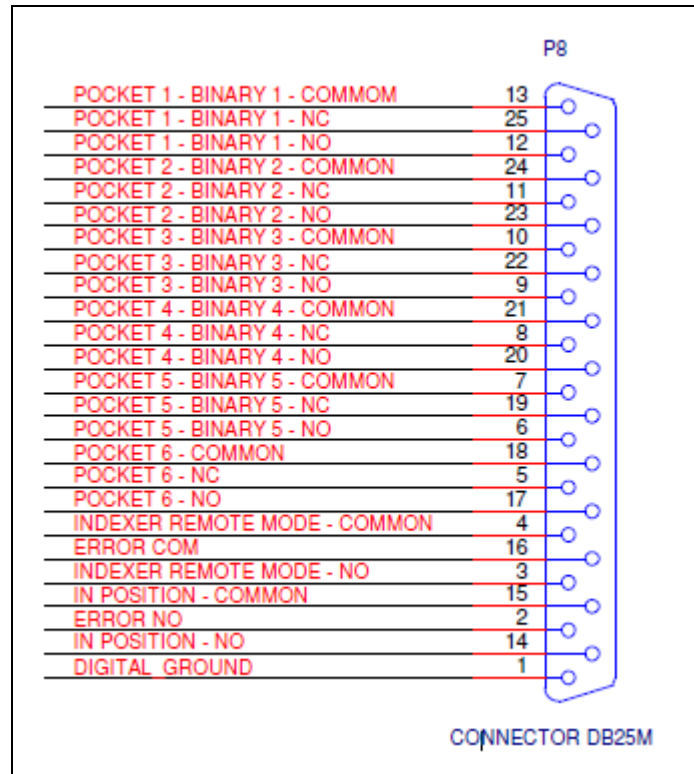
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Figure 3-D   Output Connections

Host - J5

The host port is for upgrading the Six Crystal Controller software.

Motor Assembly

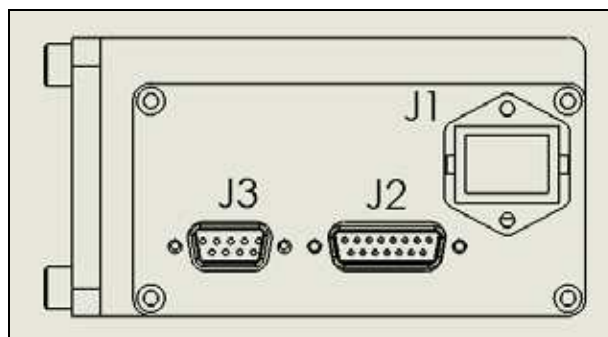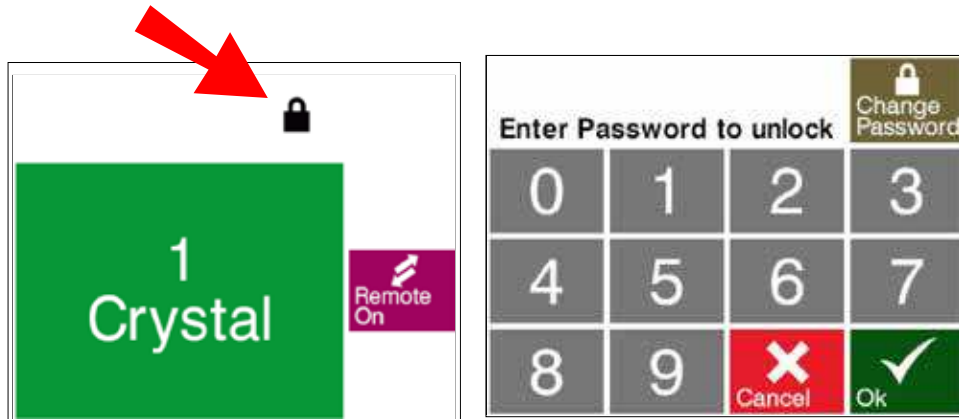Connectors J1 and J2 connect to the chassis with the supplied cables. Connector J3 is not used.

Figure 3-E   Motor Assembly Connections

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CONFIGURATION

Unlocking

To configure the Six Crystal Controller first it must be unlocked. Press the lock to unlock the sweep and enter the password.

The default password is "1234". The password can be changed at this time by pressing the **Change Password** button. Once the sweep is unlocked it will stay unlocked until it is locked by pressing the **lock** or by turning the power off.

Configuration
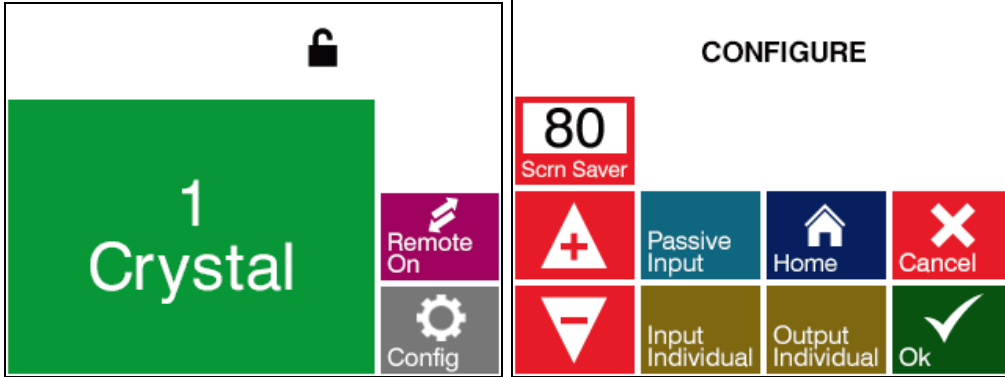
Once the Six Crystal Controller is unlocked then the **Config** (Configure) button can be pressed.

Home

Press the home button and the motor will turn to crystal 1 position. Loosen the coupler on the shaft, rotate shaft till crystal is lined up. Retighten coupler.

Screen Saver

First press the setting to adjust, it will turn red, then press the "+" and "-" to adjust the numeric value.

Scrn Saver (Screen Saver) - Time till Six Crystal Controller goes into screen saver mode and blanks the screen (0-300 minutes). Touch the screen to wake screen up. The Six Crystal Controller is always operational if the power is on.

Input/Output

Passive/Active Input – Input can be configured two ways

1. **Passive** TTL level inputs activated by a short across input pins.
2. **Active** inputs activated by 12 to 24 volts DC across the input pins.

Input – Selecting a crystal from a PLC or other device can be done by using the optically isolated Six Crystal Controller inputs. See table below for binary code.

1. **Binary 1=00000**
2. **Binary 1=00001**
3. **Individual**

Output - Relay isolated outputs 6 crystals directly or binary.

1. **Binary 1=00000**
2. **Binary 1=00001**
3. **Individual**

| "Binary 1=00000" **Crystal Number**	"Binary 1=00001" **Crystal Number**	**Binary Bit 2**	**Binary Bit 1**	**Binary Bit 0**
1	1*	0	0	0
2	1*	0	0	1
3	2	0	1	0
4	3	0	1	1
5	4	1	0	0
6	5	1	0	1
Not used	6	1	1	0

* Note: For "Binary 1=00001" 00001 and 00000 both equal crystal one.

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OPERATION

Power Up

Once alignment has be performed as described in the Configuration chapter 4, the Six Crystal Controller will remember where the crystals are even after power has been turned off and on. On power up, press Ok if nothing as moved when the power was off. Press "Find Crystal" to find the internal reference home and then it will return to the last crystal location.
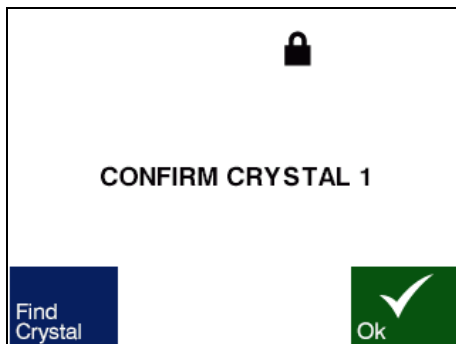
If for some reason the crystal does not line up repeat the Alignment procedure in chapter 4.

Operation

Crystals are selected by pressing the large green button. A list of crystals numbers will display. Press the desired crystal.
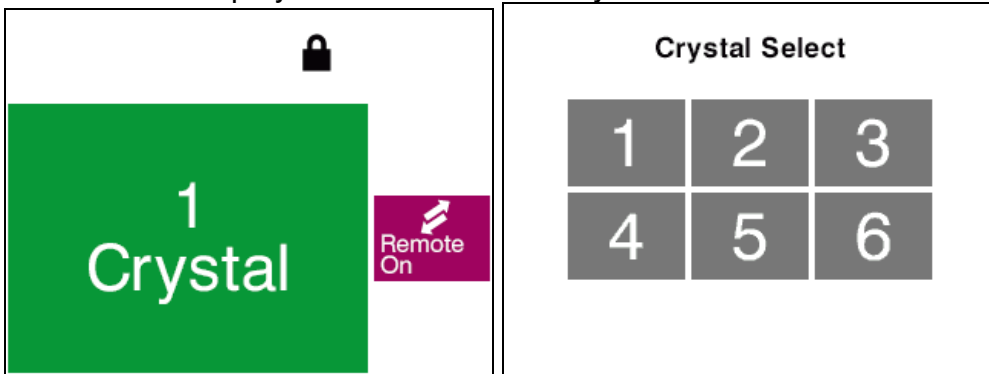
Remote Operation

The 6-crystal controller can be operated remotely. Press the **Remote On** button to activate remote operation. "Remote Control On" will be displayed when in remote mode.