

Congratulations on your purchase of an Ormec XD-Indexer kit.

WARNINGS

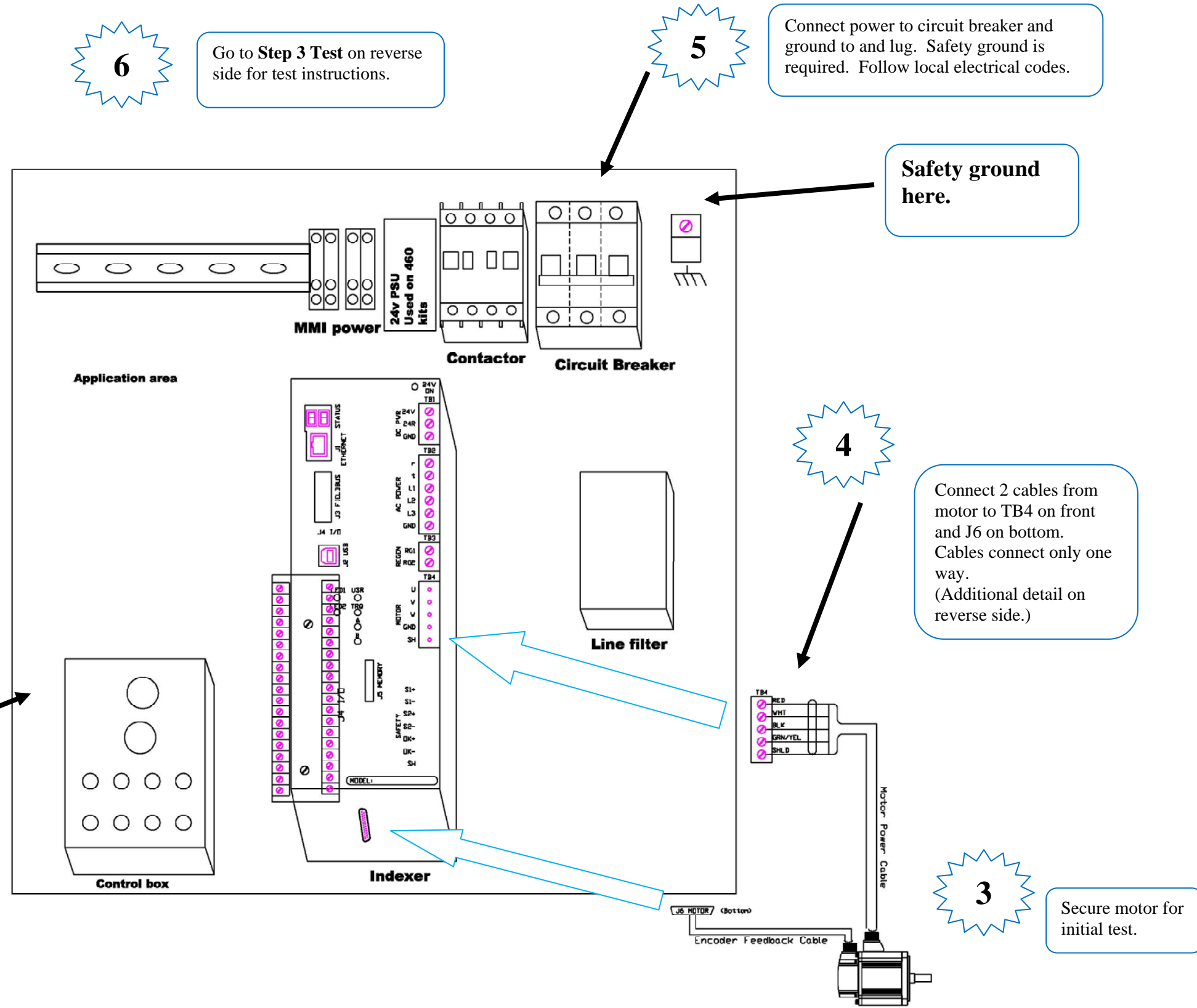
1. You are working with dangerous, high voltages. Only qualified persons should make connections and changes. Do not touch any live parts while the power is on.
2. **Double check all wiring. When working with high voltages mistakes can be dangerous and costly.**
3. Secure the motor. Motors can be dangerous. The output shaft will turn and the motor may jump or move under some circumstances if not secured. Stay clear of the motor shaft. Secure the motor so that it cannot jump.

1

Gather tools – ¼” flat blade screwdriver and wire cutters/strippers. Remove kit from the shipping box. Note there are more instructions on reverse side. You must supply wire for connection to your plug or panel.

2

Remove control box by cutting shipping restraint.



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This kit Getting Started sheet is written for panel and enclosure versions of the kit where the wiring is complete. If you received a parts only kit it is recommended that you wire your system following the layout shown and then return to this document or reference the complete installation instructions.

Step 1 - Unpacking

Throughout this explanation references are made to the layout and connection diagram. That diagram can be found on the other side of this paper.

Carefully remove the panel from box. Place on a sturdy table and orient as shown in the diagram, reverse side.

Step 2 - Connections

1. Remove the control box from the panel by carefully cutting the shipping restraint. This will allow you to step back from the panel during operation.
2. Secure the motor. While the motor is spinning it is possible for it to jump or move slightly. Securing it to the table or on the floor helps to prevent damage to the motor or your foot if it falls.
3. Connect the motor cables. There are 2 cables in the kit. One provides power to the motor. The part number on the cable begins CBL-MMX. The other cable provides motor feedback. The part number on the cable begins CBL-ME. Locate these 2 cables and connect to the motor and to the servodrive. The cables will only connect one way and in one spot.
4. Connect power to the panel. Connect your incoming power to the circuit breaker (CB1) located in the upper right corner of the panel. Be sure to connect your green safety ground.

Step 3 - Test

1. Double check your wiring before turning on power. You don't want a careless mistake to slow you down.
2. Turn on your power.
3. Turn on the circuit breaker. The XD servodrive should light up. A series of numbers will appear on the display. When complete it will display a whirligig pattern. Note: if an A3 is

displayed the Indexer has detected that main power is off. Find the control box, move the Enable switch down to the Disable position and proceed to the next step.

4. **Find the control box.**
 - a. Pull the E-Stop button out if it is pushed in.
 - b. Press the E-Stop Reset button until the contactor closes.
→ Note that there will be a loud click or thud when the contactor closes. It's normal, and it's normal to startle the first time.
 - c. The XD drive should now have the BUS POWER LED on.
5. **Enable motion** ~ On the control box move the toggle switch to the Enable position. The XD Indexer should now turn on the right dot in the lower right corner of the display.
6. **Home test** ~ Press and release the Home button. The motor should move to its home position. While it is moving the XD Indexer will show an H in the display. Press again to repeat if you missed it.
7. **Jog Test** ~ Press and hold the JOG button. As long as you hold the button the motor should jog (spin) forward (CCW). Release when you are done.
8. **Motion 1 Test** ~ Press and release the Motion 1 button. The motor will perform a slow speed, 1 rev index motion. During that time the XD Indexer will display a 1. (1 rev in 2 sec.)
9. **Stop Test** ~ Press and release the Motion 1 button then quickly press the Stop button. A motion will start with Motion 1 and Stop with the Stop button. Repeat the test if you weren't watching the motor.
10. **Motion 2 Test** ~ Press and release the Motion 2 button. This will start a series of motions to demonstrate motion repeating and chaining. There will be a sequence of longer slow moves, fast moves, fast short moves and motion in 2 directions. During this time the display on the XD Indexer will show a number which will be changing. The number indicates the motion table entry being executed. This demonstration chains together a series of entries. It then repeats the entire chain 3 times. When complete it comes to rest. You can stop the sequence at any time using the Stop button. (The motions are ½ rev in ½ sec, repeated 3 times, 1 rev in ½ sec, ¼ rev in 100 msec repeated 5 times, reverse 100 rev at 700 rpm and repeat this entire sequence 3 times.)
11. **Congratulations.** You have successfully demonstrated operation of your XD Indexer and kit and are ready to move to your application



Step 4 - Next

The Indexer and motor are running. The next steps include:

1. Mounting and connecting to your machine.
2. Connect MotionSet configuration tool.
3. Define your motions.
4. Connect your operator interface.
5. Move the E-Stop and Reset out of the control box to your machine.
6. Test and begin using it.

You may want to consult:
Indexer Kit Instructions
Indexer Getting Started
Indexer Reference Manual

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Getting started

Parts only

The parts only kit contains all the parts needed for an Indexer application. Refer to page 1 picture for assistance.

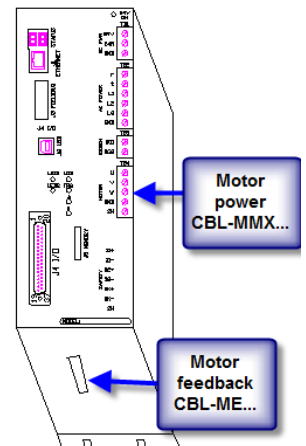
1. Unpack the parts and identify each.
2. Determine where you plan to wire your system.
3. Locate the system schematic and wire per the drawing.
4. **Double check all wiring. When working with high voltages mistakes can be dangerous and costly.**
5. A control switch box is provided for your convenience. It contains an E-Stop push button and reset button as safety features. An additional 6 switches are provided for system test. The E-Stop and Reset buttons are intended to be removed from the box and used on your machine. The other switches will likely be replaced by your equipment or other operator inputs.
 - a. Wire the control box to the CON1110 I/O breakout module. Then connect the completed assembly to the XD Indexer at J4.
6. Proceed to the Panel or enclosure section.

Panel or enclosure

Refer to page 1 picture for assistance.

With the panel or enclosure all of the wiring is already done. Next:

1. Remove the panel from the shipping box and place on a sturdy support. You will need power and a little space to perform the initial test.
2. Remove the control box from the panel by carefully cutting the shipping restraint. This will allow you to step back from the panel during operation.
3. Secure the motor. While the motor is spinning it is possible for it to jump or move slightly. Securing it to the table or on the floor helps to prevent damage to the motor or your foot if it falls. The turning motor shaft can wind a tie or cord. Keep clear while the motor is turning.
4. Locate the SAC-XD Indexer. It is a black unit mounted near the lower right corner of the panel.
5. Connect the motor cables to the Indexer. The encoder cable (CBL-ME...) attaches to the bottom of the Indexer, location J5. Be sure to secure with the locking screws. The power cable (CBL-MMX...) connects to TB4. Plug it in.



6. Connect your input power. The power is connected to the circuit breaker located near the upper right corner of the panel. All kits require 3-phase power except the ID XK-.5HP2 and ID XK-1HP2. DO NOT turn on power yet.
7. If you have an MMI or an MMIK kit connect the MMI at this time.
 - a. The power cable connects to 24VDC on the panel. A pair of terminals with 24 VDC power is provided and is located on the panel DIN rail at the left end.
8. Turn on the power to the panel.
9. Turn on the circuit breaker on the panel.
10. The Indexer should power up. The display will show the Ethernet address of the Indexer and then display a whirligig pattern.
11. Pull out the E-Stop push button. Then press the black Reset button. This will close the contactor and apply power to the Indexer motor power. Note that there will be a load thud when the contactor closes. It's normal, and it's normal to startle the first time. The XD drive should now have the BUS POWER LED on.
12. Find the control switch box.
 - a. Toggle the enable switch to Enable. The right decimal point in the Indexer status display will come on.
 - b. Press and release the Home button. The motor should move to its home position. While it is moving the XD Indexer will show an H in the display. Press again to repeat if you missed it.
 - c. Press and hold the JOG button. As long as you hold the button the motor should jog forward (CCW). Release when you are done.
 - d. Press and release the Motion 1 button. The motor will perform a moderate speed, 10 rev index motion. During that time the XD Indexer will display a 1. (1 rev in 1.5 sec.)
 - e. Now test the Stop button. Again press and release the Motion 1 button to start a motion. While that is running press and release the Stop button. The motor will stop.
 - f. Press and release the Motion 2 button. This will start a series of motions to demonstrate motion repeating and chaining. There will be a sequence of longer slow moves, fast moves, fast short moves and motion in 2 directions. During this time the display on the XD Indexer will show a number which will be changing. The number indicates the motion table entry being executed. This demonstration chains together a series of entries. It then repeats the entire chain 3 times. When complete it comes to rest. You can stop the sequence at any time using the Stop button. (The motions are ½ rev in ½ sec, repeated 3 times, 1 rev in ½ sec, ¼ rev in 100 msec repeated 5 times, reverse 100 rev at 700 rpm and repeat this entire sequence 3 times.)
 - g. Congratulations. You have successfully demonstrated operation of your XD Indexer and kit and are ready to move to your application.

What Next

Now that you have the Indexer operational and moved the motor as a demonstration you are ready to work on your application. We recommend this sequence:

1. Download and install MotionSet software on your computer. This will allow you to configure the Indexer and change the motions as required for your application. For a general overview see <http://www.ormec.com/Products/Software/MotionSet.aspx> and to download see <http://www.ormec.com/ClickOnce/MotionSet/install.htm> . You may need to register on the site before downloading.
2. Read and follow the Getting Started guide and establish communications and start your project definitions.
3. Define as many of the final motions as possible and test those that you can before connecting to your machine.
4. Mount the motor on your machine.

5. Install the electronics near your machine. Add any needed sensors or devices.
6. Carefully test the system and refine any motions used.
7. Backup and archive the project files when you have it right.
8. Put the system into production.

What motions are installed?

Your Indexer has been preloaded with a number of example motions.

Component features -

Circuit Breaker: Protects wiring and responds to electrical problems.

Line Filter: limits electrical noise into and out of this system. Incoming noise from other electronics can cause interference or other problems. All servo systems produce some electrical noise due to the high speed switching. It is best practice to keep that noise from traveling to other equipment in the plant.

E-Stop: Though never planned sometimes things go wrong. An emergency stop push button is a best practices approach to safety. This is implemented as a push-pull switch.

Contactors: As part of the best practices the contactor is used to remove motor power from the servodrive when an E-Stop state exists. Without energy to the power section of the servodrive the motor cannot move.

E-Stop reset: Another best practice, once the E-Stop is opened and power removed then 2 actions are needed to restore power, the E-Stop button must be pulled out and then the E-Stop Reset must be pushed long enough to bring in the contactor.

Servodrive: The brains behind the motion. The Indexing Servodrive calculates all the velocity, position and motion parameters to perform the commanded move. During the move the servodrive continues to monitor the motor and using closed loop feedback performs current command corrections to adjust for load, friction and other disturbances. The power electronics are located inside and controlled by the servodrive.

Motor: The device which converts electrical energy to the mechanical energy needed on your machine.

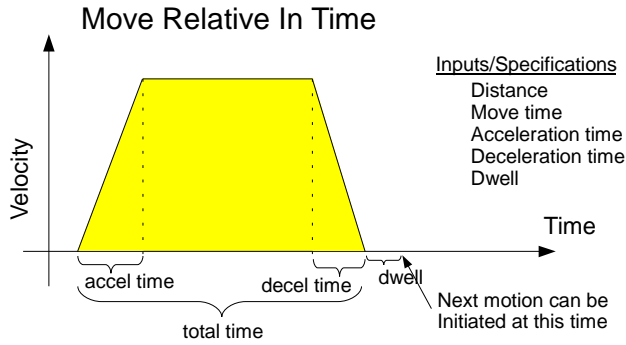
MMI: A convenient and modern approach to interface with the Indexer and control your machine.

Control switch box: This is a diagnostic and startup convenience. This provides a few inputs so that you can test the connections and get going quickly. The E-Stop and E-Stop Reset switches are fully industrial grade and expected to be used on the final equipment. The Enable and motion switches are expected to be replaced by your desired switches and push buttons on the machine, or an MMI interface.

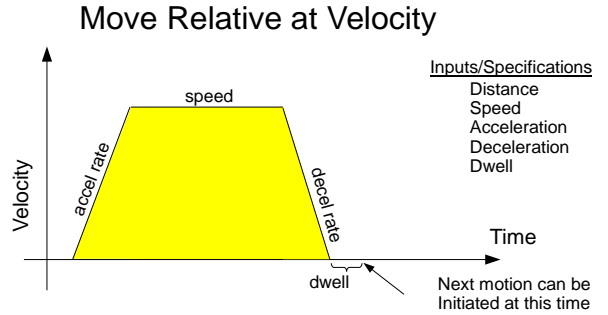
Motions -

The Indexer can perform a wide variety of motion types. These range from multiple home functions, jogging, move a relative distance, move to an absolute position, gear to an external encoder or motor at an adjustable ratio.

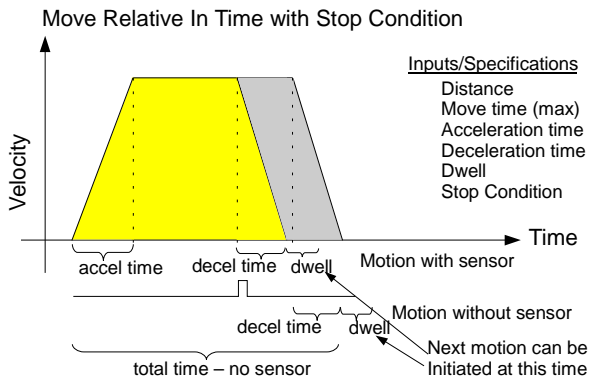
The graphs below provide an overview of the motion types. A complete list and full details can be found in the Indexer installation and operation manual.



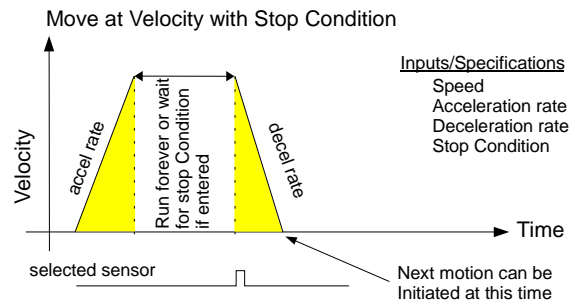
Moves a defined distance. The motion takes the specified time ~ meaning the speed is automatically calculated so that the motion is completed in the required time..



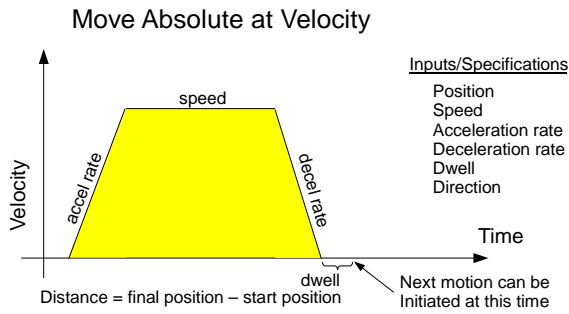
Moves a defined distance. Speed is the controlling parameter. The speed of the motion is set in the motion command. The time required will be calculated and dependent on the speed.



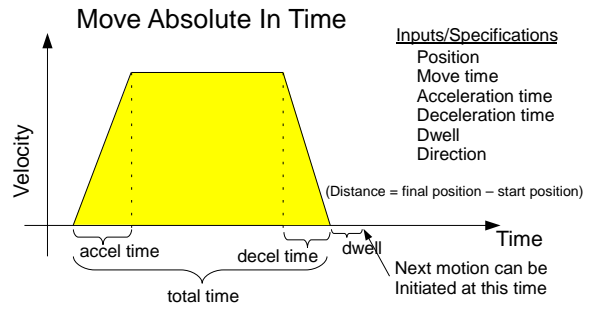
Move until sensor with a maximum distance. This motion begins to Move a given distance from the current position and stops earlier if the sensor occurs. If the sensor is missed the motor stops at the defined distance, which prevents a runaway situation.



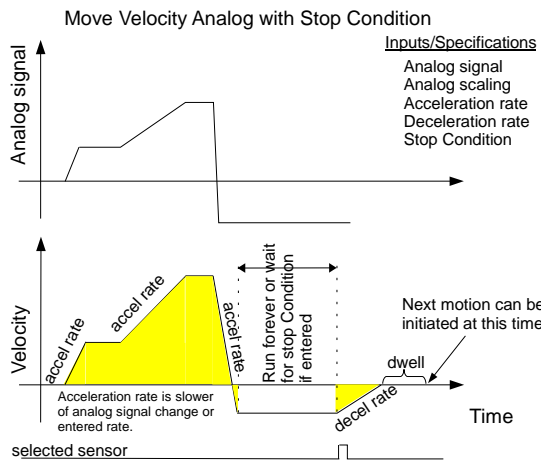
Move until sensor. This motion is a Jog with stop on sensor. Unlike the previous motion this can run forever. If the sensor breaks or is missed the motor will continue.



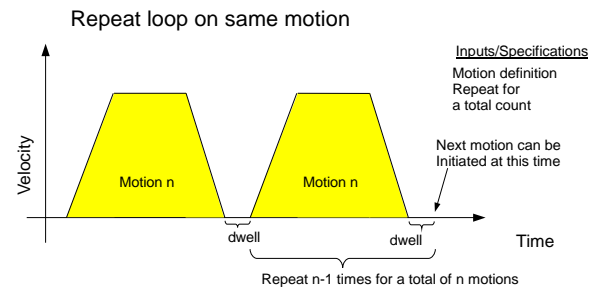
Move to a specific position. The speed is automatically calculated with a maximum speed. This motion is used to get to a specific position or angle when the starting position is unknown.



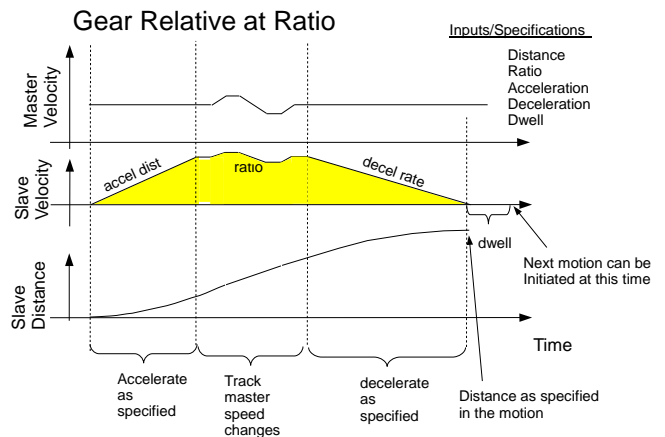
Move to a specific position taking a specific amount of time. The speed is automatically calculated with a maximum speed. This motion is used to get to a specific position or angle when the starting position is unknown.

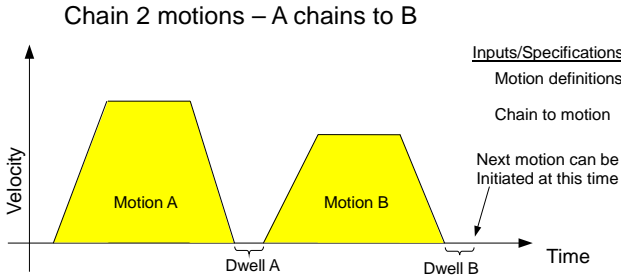


Move at a speed set by a pot. A voltage input sets the speed of the motor and can be changed at any time, including when the motor is running.

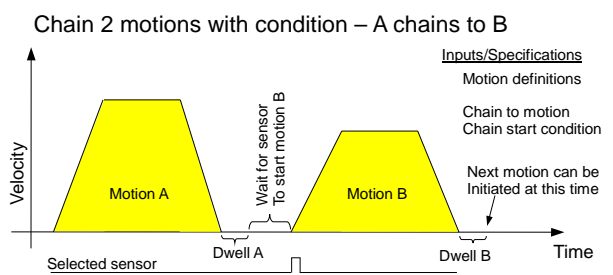


Any motion which stops can be set up to loop and repeat. The time between the repeats is configurable. The number of repeats can be set between 1 and 2,000,000,000.

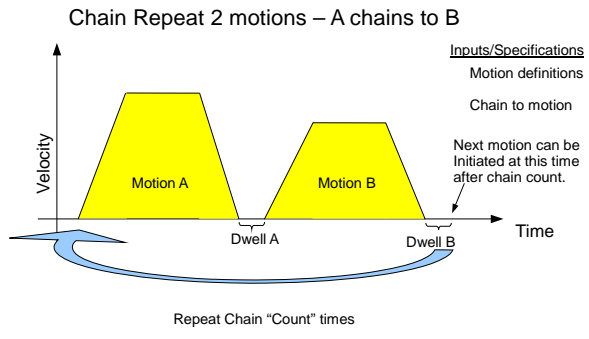




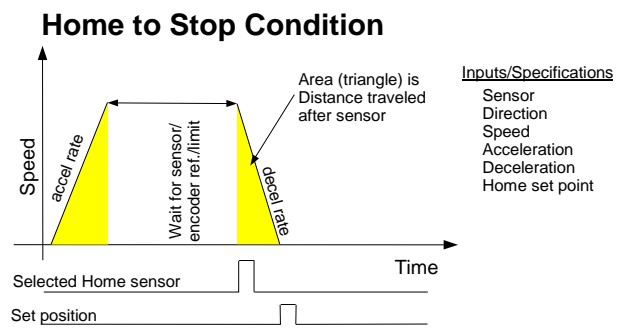
Chaining connects 2 or more different motions together. This is useful when a series of motions are always performed together and start on one signal.



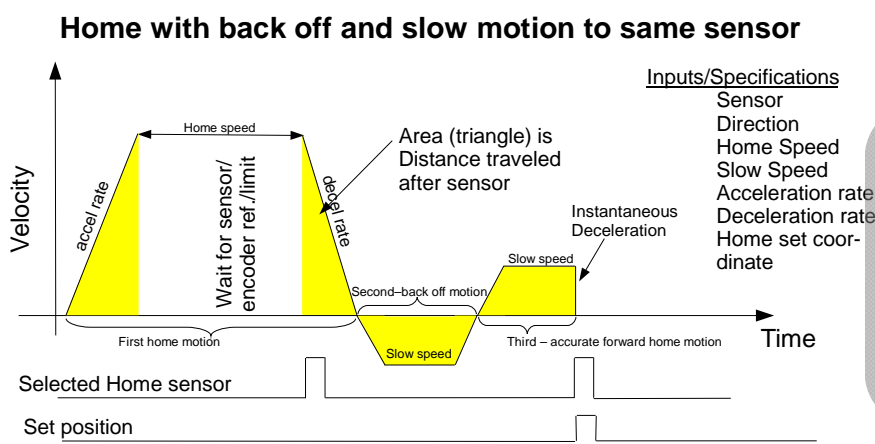
Chaining can include motions which are tied to a sensor. The motion dependent on the sensor will wait for the sensor. In this example Motion A runs when initiated then chains to Motion B which waits until the sensor occurs.



Complete chains can be repeated just like individual motions can be chained. Repeating a motion within a chain and repeating the chain can be done at the same time.



Basic home function decelerates and stops when the selected sensor becomes active. The stop position is a little past the sensor.



Home with reverse and approach decelerates and stops when the selected sensor becomes active, then backs up past the sensor and does a slow approach to the sensor. The stop position is at the original leading edge of the sensor.