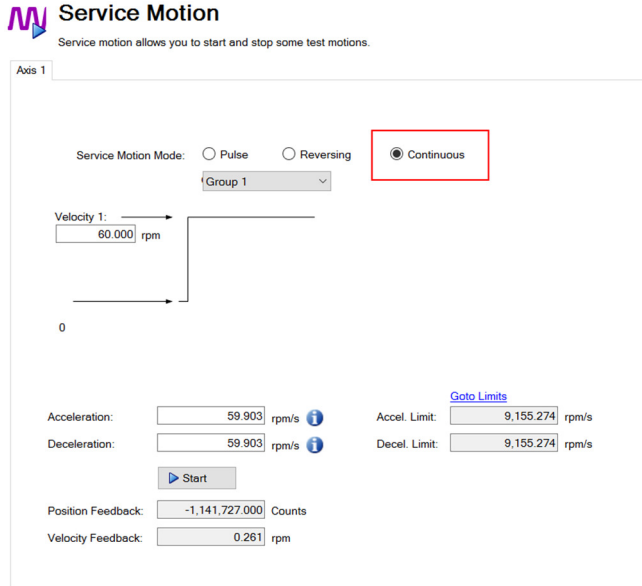**AKD Jogging Over Modbus TCP**

There are 2 possible methods for using Service Motion to Jog the AKD over Modbus TCP: 1) Native SM parameters (i.e. SM.V1, SM.MOVE, and DRV.STOP) 2) Using the special MODBUS parameters MODBUS.SM.

Method#1:

1. Setup Workbench on the Service Motion screen to use continuous.

2. If desired set independent accel/dec for service motion in the GUI otherwise leave zero and the DRV.ACC and DRV.DEC limits are used (they still are the override in the non-zero case). See above.
3. To jog + write a positive value to SM.V1 and use SM.MOVE to start the jog.
   To stop use DRV.STOP.
   To jog - write a negative value to SM.V1 and use SM.MOVE to start the jog.
   To stop use DRV.STOP.

SM Parameters

This section describes the SM parameters.

- SM.ACC
- SM.DEC
- SM.I1
- SM.I2
- SM.MODE
- SM.MOVE
- SM.T1
- SM.T2
- SM.V1
- SM.V2

SM.I1	746		32-bit, signed
SM.I2	748		32-bit, signed
SM.MODE	750		16-bit
SM.MOVE	752		Command
SM.T1	754		16-bit
SM.T2	756		16-bit
SM.V1	758	Yes	low 32-bit word, signed
SM.V2	760	Yes	low 32-bit word, signed

DRV.STOP	274		Command

Method#2: An alternative method of using Service Motion to Jog over Modbus TCP uses the special parameter MODBUS.SM.

MODBUS.SM

Description

Bit 0 is linked to SM.MODE. 0 = constant motion in one direction, 1 = alternating motion

Bit 1 controls SM.MOVE. Edge triggered:

0 -> 1: execute SM.MOVE

1 -> 0: stop service motion through DRV.STOP

Bit 0 is evaluated before bit 1. If an error occurs while evaluating bit 0, any change to bit 1 will not be applied.

General Information

Type	R/W
Units	N/A
Range	0 to 3
Default Value	0
Data Type	Integer
Start Version	M_01-03-00-004

Fieldbus	Index/Subindex	Is 64 bit?	Attributes	Signed?
Modbus	952	No	32 bit	No

	Bit 1	Bit 0	Decimal Equivalent
No Move and Direction=one direction	0	0	0
No Move and Direction=alternating	0	1	1
Move and Direction=one direction	1	0	2
Move and Direction=alternating	1	1	3

Note the direction bit 0 must be set to the desired before the rising edge of bit 1 per the WB Help description above. Also note to move there must be a rising edge transition from 0->1 on bit 1 for the SM.MOVE to take place and also a falling edge transition from 1->0 on bit 1 for the DRV.STOP to take place.

Therefore there are 2 possibilities using MODBUS.SM with the same resulting operation.

Method#1:

1. Initially MODBUS.SM=0 (neutral).
2. To Jog Forward set MODBUS.SM=2.
3. To Stop set MODBUS.SM=0.
4. To Jog Reverse set Modbus.SM=3
5. To Stop set MODBUS.SM=0 (note in this case both bit 1 and bit 0 are set back to zero).

Method2:

1. Initially MODBUS.SM=0 (neutral).
2. To Jog Forward set MODBUS.SM=2.
3. To Stop set MODBUS.SM=0 (note in this case only bit 1 is changing and the direction bit 0 stays 0).
4. To Jog Reverse set MODBUS.SM=3.
5. To Stop set MODBUS.SM=1 (note in this case only bit 1 is changing and the direction bit 0 stays 1).

Summary of the Above:

SM.MOVE/DRV.STOP	SM.MODE	Decimal	Transistion To
0	0	0	Stop Forward
0	1	1	Stop Reverse
1	0	2	Move Forward
1	1	3	Move Reverse

Jog Fwd		0 to	2
Stop		2 to	0

Jog Rev		0 to	3
Stop		3 to	0

Alternative also will work

Jog Fwd		0 to	2
Stop		2 to	0

Jog Rev		0 to	3
Stop		3 to	1

To Setup Service Motion for Jogging Using MODBUS.SM:

STEP 1: Set Service Motion To Reversing. Set Velocity 1 for Jog Fwd Speed and Velocity 2 for Jog Rev Speed.
Note: SM.V1 and SM.V2 are accessible over Modbus if there is a need to change the Jog Fwd or Jog Rev velocity setpoints.
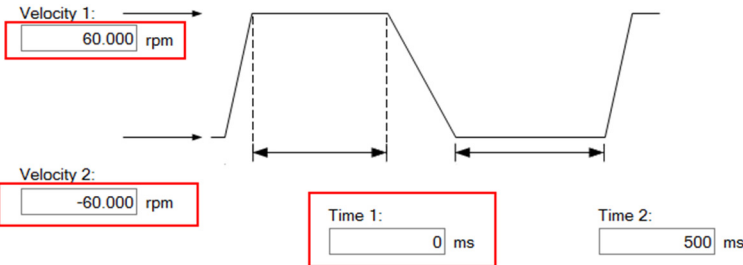
STEP2: Set Time 1 (SM.T1) equal to zero. The reason for this is the MODBUS.SM's direction bit 0 will toggle between forward or continuous and reverse or reversing while in operation (and monitoring in Workbench). While in reverse both Velocity 1 and Velocity 2 will be shown but Velocity 1 will be used for 0 ms and there operate/jog continuously in the reverse direction based on the Velocity 2 setpoint (value must be negative otherwise the Jog Reverse command will simply jog forward at the SM.V2 speed).

STEP 3: Set to Continuous Mode. An important note here is do not toggle back to the Reversing radio button at this point using the Workbench GUI because the SM.T1 will revert back to 500msec (a nuance of the GUI).
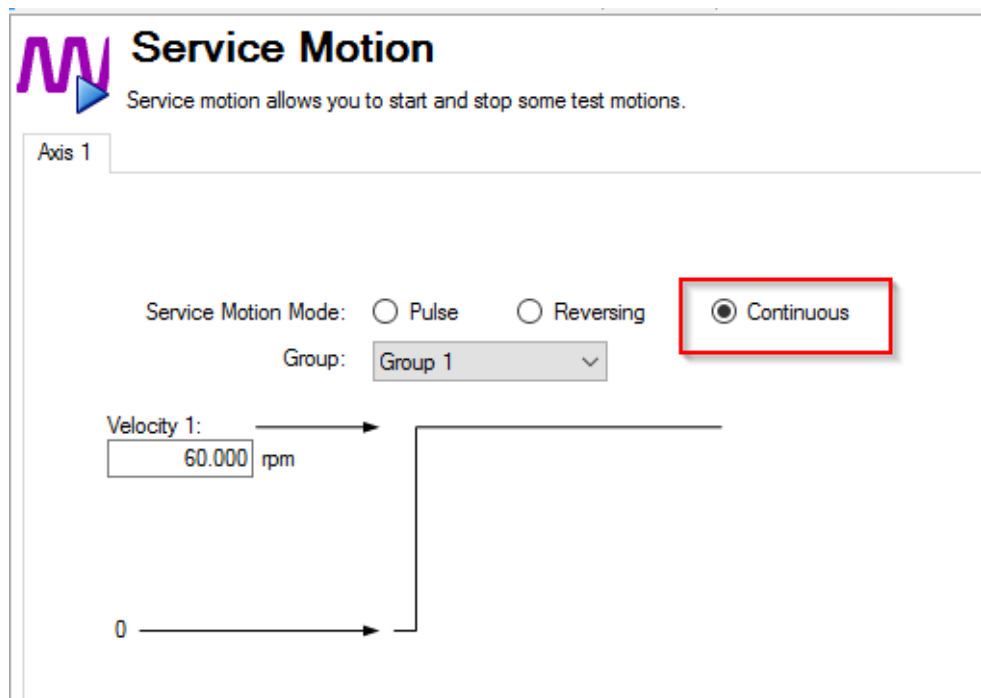
STEP 4: Save to Device.
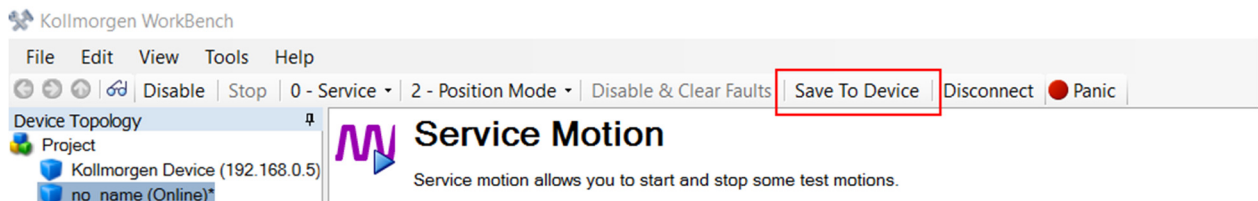
Demonstration of Operation (using MODBUS.SM):

Initially Service Motion is stopped and the MODBUS.SM modbus register 952 and 953 are 0 (this was displayed as a 32 bit LONG in Modbus Poll for example).

The Service Motion screen looks like this in this example.

Next the command to Jog Forward is sent.

The Service Motion screen looks like this in this example.

Next the command to stop was sent.

Next the command to Jog Reverse was sent.
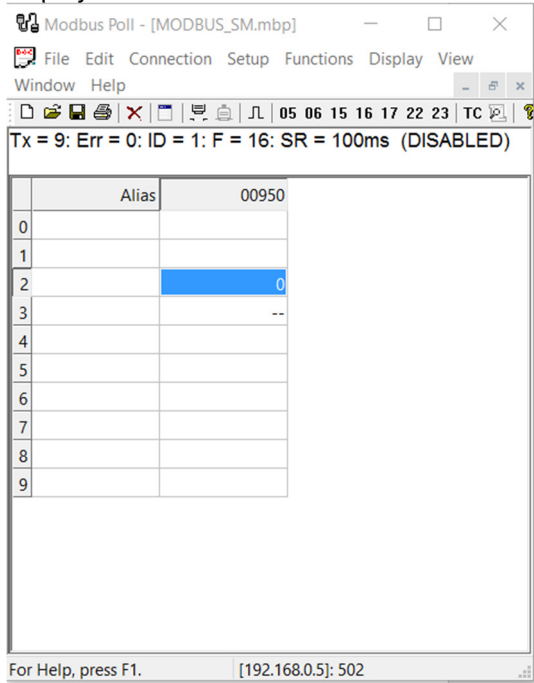
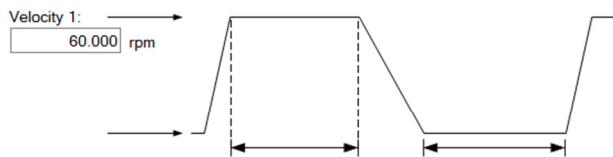## Service Motion

Service motion allows you to start and stop some test motions.

Axis 1

Service Motion Mode: ○ Pulse   ● Reversing   ○ Continuous

Velocity 1:
60.000 rpm

Velocity 2:
-60.000 rpm

Time 1:
0 ms

Time 2:
500 ms

Goto Limits

Acceleration: 59.903 rpm/s ⓘ   Accel. Limit: 9,155.274 rpm/s

Deceleration: 59.903 rpm/s ⓘ   Decel. Limit: 9,155.274 rpm/s

☐ Stop

Position Feedback: 3,712,137,874,647.0 Counts

Velocity Feedback: -60.269 rpm

And then the command to stop was sent.

These methods can also be used with the AKI HMI.