

## Connecting Galil CDS3310 to Danaher AKM w/Commcode

**Steps:**

- (1) Power up the Galil CDS-3310 first, connect the programming cable, and run WSDK or Smart Terminal Galil software. After connecting to the controller, go into Terminal Mode, and set the Motor Type to MT-1 OR Encoder Type to CE2, then Burn the variables into Flash using BN. This will prevent a motor runaway when the CDS and AKM are both powered up.
- (2) Disconnect Power from the controller and prepare to connect the motor and feedback cables.
- (3) Before starting, you should recognize that the AKM motor you intend to connect the power to uses a Wye connection and the Galil CDS incorporates a Delta connection. A Delta connection only requires 3 phases whereas the Wye type requires 3 phases plus a Neutral, so when wiring you will not connect the Neutral wire. How does this affect performance? The Delta connection's Kv(V/krpm) will be 1.73 higher, whereas the Delta Kt (A/N-m) will be 1.73 lower as compared to the same motor with a Wye connection. This must be factored into your motion calculations to maintain accuracy.
- (4) Take the AKM CP power cable and connect it the mating 5-pin molex connector coming from the AKM motor. You should notice that the individual wire color code of the cable out of the motor is different to the color code of CP power cable. We have created a table that crosses the color code over between these two connections. The last column in the table shows where to connect the wire color from the CP power cable to the Galil J1 motor cable.

[AKM22G-xxMN\(1 or 2 or Ex\)-00 Motor Power Connection to Galil CDS-3310](#)

Motor Molex Power Connector			Mating Connector from CP102AACN-xx	Galil J1 Motor Connector
Pin	Function	Wire Color	Wire Color	Pin
1	U	Blue	Red	J1 – A
2	V	Brown	White	J1 – B
3	W	Violet	Black	J1 – C
4	GND	Grn/Yel	Grn/Yel	No Connection
5	Shield		Shield	Chasis Ground

- (5) Take the AKM CF Feedback cable and connect the molex end to the 18-pin molex connector coming from the AKM motor. Like the Power Cable, you should notice that the individual wire color code of the cable out of the motor is different to the color code of the CF Feedback cable. A table is shown below to show how they match up along with the connections to the Galil CDS Controller/Drive. Cut the other connector with the High Density DB9 connector of and expose the wires. Connect these wires up to CDS controller. The pin assignments description in the table below corresponds to the CDS interconnect module connected to the High Density connector on board the controller.

Motor Molex Feedback Connector			Mating Connector from CF-CD6341N-xx-x		Galil ICM-3300	
Pin	Function	Wire Color	Drive Pin	Wire Color	Pin	Label
1	B+	Green	14	Brown	5	MBX+
2	B-	Green/Black	15	Brown/Black	8	MBX-
3	A+	Blue	12	Yellow	9	MAX+
4	A-	Blue/Black	13	Yellow/Black	10	MAX-
5	Z+	Violet	6	Orange	5	INX+
6	Z-	Violet/Black	7	Orange/Black	6	INX-
7	Gnd	Black	11	Inner Braid Shield	14	GND
8	PTC	Blue	8	Blue	N/C	N/C
9	PTC	Black	9	Blue/Black	N/C	N/C
10	Vcc	Red	10	Red	15	+5V
11	N/C					
12	N/C					
13	N/C					
14	N/C					
15	Hall U	Brown	1	Green	13	HALL A
16	Hall V	Grey	2	Black	12	HALL B
17	Hall W	White	3	White	11	HALL C
18	Shield		Housing	Outer Braid Shield	N/C	N/C

- (6) Temporarily disconnect the motor power cable from either the controller or from the motor. We need to test the Hall Sensor and encoder signals that we just connected first. Hall sensors are used to commutate the power stage within the CDS drive to properly spin the motor.
- (7) Power the controller back up, run the Galil setup software, reconnect the controller, and go into Terminal mode. To test the Hall sensors you use the Query Hall command QHX. Type the command in, and the Galil controller will return a number from 1 to 6 representing the 6 possible sequence combinations out of the hall sensors inside the motor. Ever so slightly spin the motor shaft, and keep typing the QHX command to get a number. A properly wired Hall feedback will have the following sequence starting with any number in this sequence and wrapping around over and over as you spin the motor and type QHX. Be careful you may miss a number when in fact you may have skipped by it. The sequence should be: 1, 3, 2, 6, 4, 5, where you typed in QHX to get one number at a time. If you are sure that the sequence is incorrect then you need to rewire the Hall sensors using different connections until you get the correct combination but you shouldn't have to do this since this has already been tested.
- (8) Next, we test the encoder connections. Either go into the Motion Status > System Overview, or type the TP command as you spin the motor shaft CW and CCW. You should see the encoder count changing up and down. If you don't you need to change your wire connections and re-try this until you see the encoder count.
- (9) Once you confirm the feedback, disconnect the CDS power, reconnect the motor power cabling, and then reconnect the power back to the CDS controller. Make sure the motor isn't spinning in a runaway situation or else you would have to change back and save the MT or CE settings.

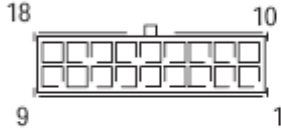
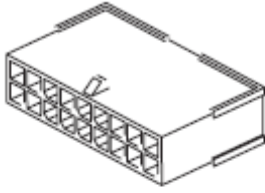
- (10) Go back into the Galil software, enter into the Terminal mode, type in you PID settings. A good start would be a KDX=100, a KPX=20, and a KIX=1. Do A Servo Here using the SHX command and the motor shaft should be really stiff. If not, you would need to tweak the PID settings some more. Do a Jog move of 10000, and -20000, you should see the motor spin in different directions and different speeds. You are now ready to program motion into the CDS controller.

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# COMMUTATING ENCODER

(VIEW FACING FRONT)



## CONNECTOR PART NUMBER MOLEX 43020-1801

PIN	FUNCTION	COLOR
1	B	GREEN
2	$\bar{B}$	GRN/BLK
3	A	BLUE
4	$\bar{A}$	BLUE/BLK
5	Z	VIOLET
6	$\bar{Z}$	VIOLET/BLK
7	GND	BLACK
8	THERMAL SENSOR	BLUE
9	THERMAL SENSOR	BLACK
10	Vcc	RED
11	N/C	
12	N/C	
13	N/C	
14	N/C	
15	U	BROWN
16	V	GREY
17	W	WHITE
18	SHIELD	

SHIELD IS NOT CONNECTED  
AT MOTOR END

## SUGGESTED MATING CONNECTOR

MOLEX 43025-1800