

MEA-4000-BCD Control

Description

This technical note serves as a quick-start guide for configuring and operating the MEA-4000-BCD with an AFP Stream Selection Valve. The multiposition actuator is controlled through a compatible BCD cable connected directly to an Agilent™ GC.



Characteristics

- 30% smaller footprint vs previous model (4.20" x 2.125" x 2.75").
- Easy switching from 4 ports to 16 ports.
- No need for multiple actuator models for the different types of valves
- Two modes – fast actuation or high torque set by serial command.
- CE approved.
- Direct replacement of multiposition electrical actuators in the market.
- AFP_CLIENT utility software for easy configuration of the actuator.
- Multiple run time information: track the number of boots, actuations, etc

Serial Communication Features

SPECIFICATION	DESCRIPTION	
8-bit Microcontroller and configuration Memory		
USB 2.0	Full Duplex	9600 Bauds
RS-232	Full Duplex	9600 Bauds
Operating temperature	Fahrenheit (°F) Celsius (°C)	32°F to 140°F 0°C to 60°C
CE Conform, RoHS		

Electrical Specifications

General Application

SPECIFICATION	DESCRIPTION	
Supply voltage input (Transient and Reverse polarity protection)	Typical	24 Volts DC / 1.5 Amp.
Standby power consumption	Typical	1.6 W.

Digital Input Specifications

ALL DIGITAL INPUTS	OPTO ISOLATED
Open collector input	5V / 1.0kΩ = 5 mA Typical
Dry contact (switch to GND)	Internal pull-up

Digital Output Specifications

ALL DIGITAL OUTPUTS	OPTO ISOLATED
Opto isolated output	Internal pull-up 5V / 1.0kΩ = 5 mA
Output Voltage	TTL level +5 Volts
Output Current	5 mA

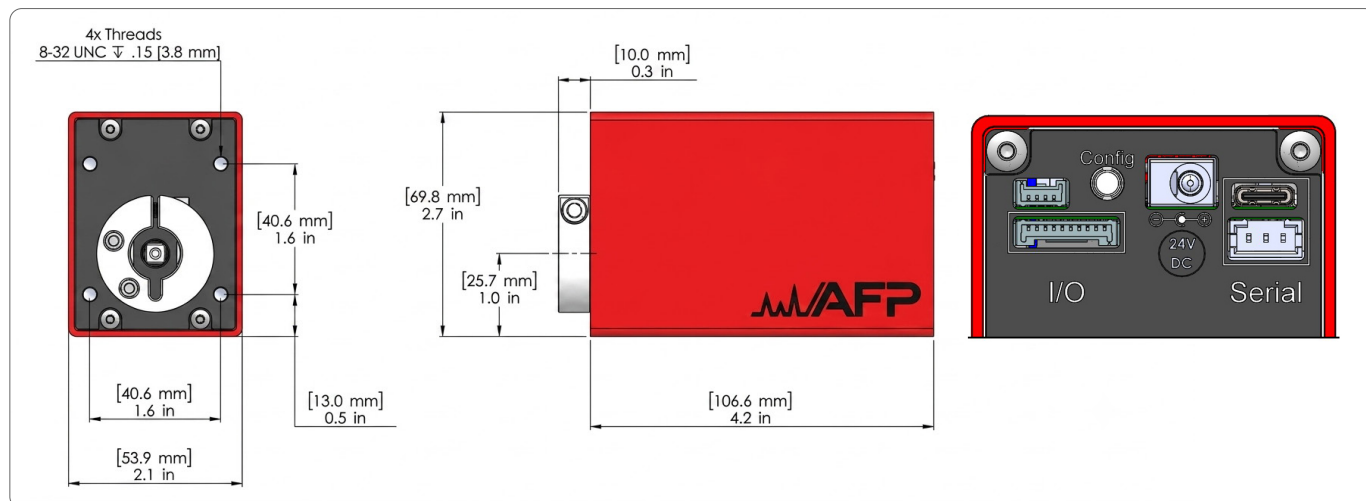
Serial Communication Features

- Compatibility between AFP product family
- Easy to use text command (ASCII)
- Return parameter to confirm command execution

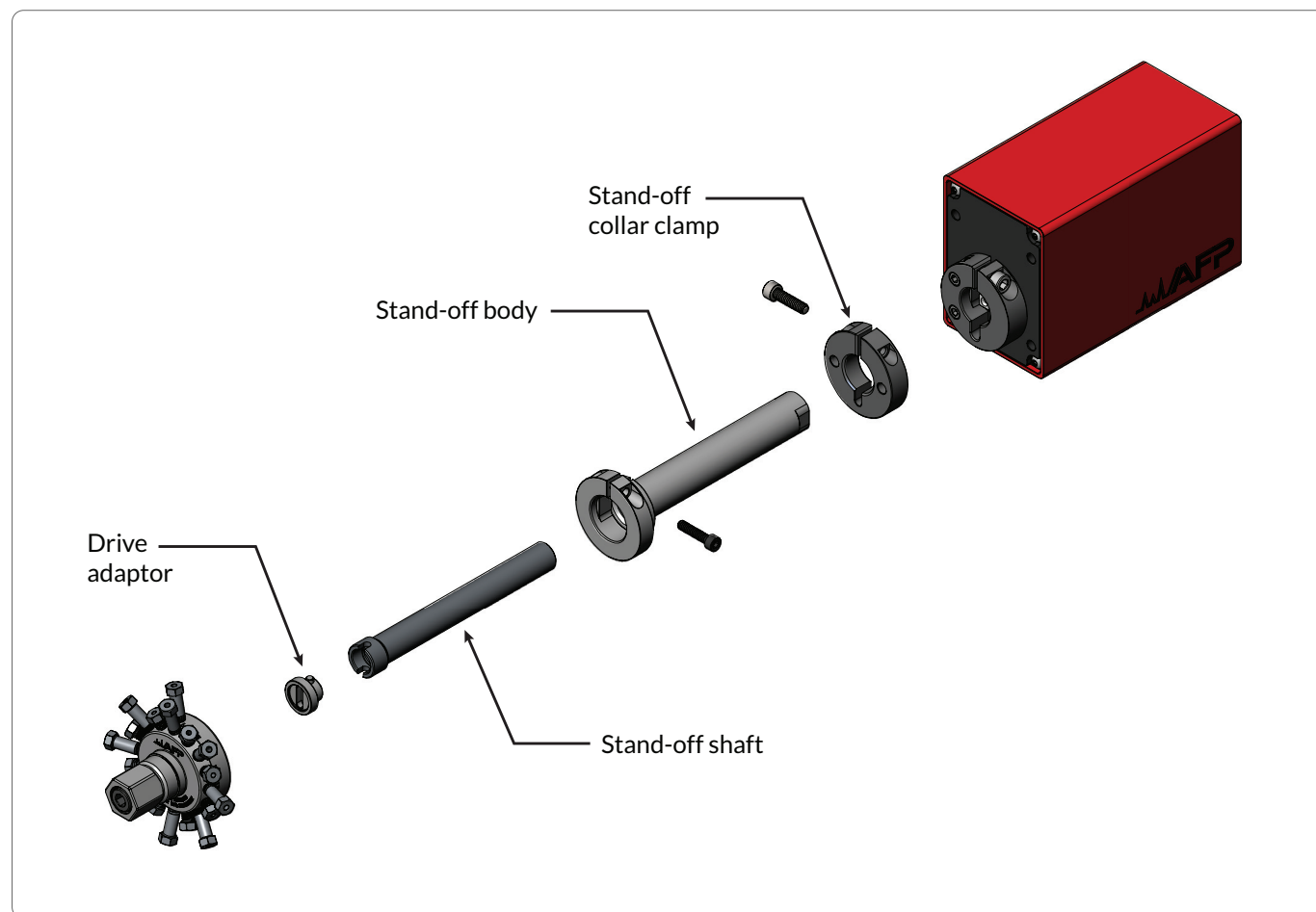
MEA-4000-BCD Default Configuration

Control Mode: Fixed to BCDI	
Number of ports: 08	CMD_015
Torque: High	CMD_019
Secondary protocol: Not available	
ID number: Fixed to 01	
Selection Mode: GC-8890	CMD_014

Dimensions



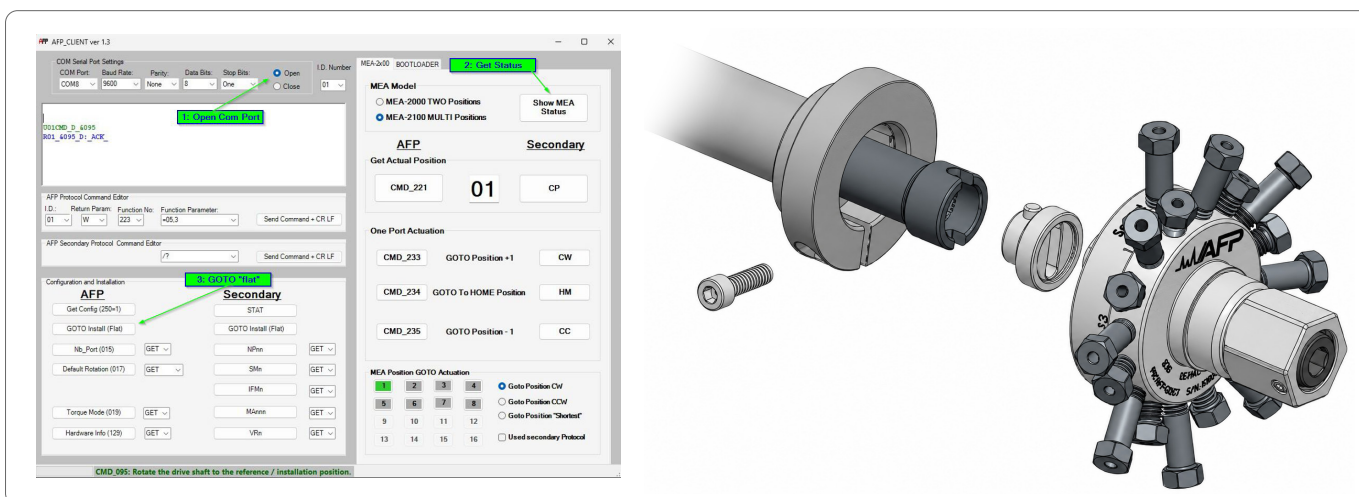
Standard Assembly



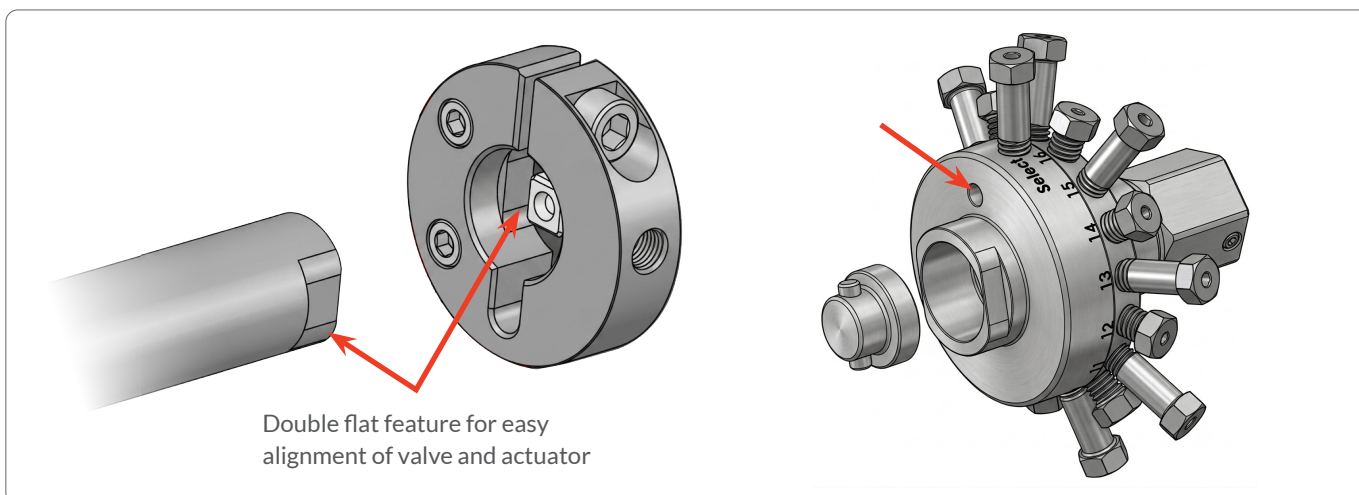
Before Starting

For your own safety, before installing or changing a valve on the MEA-4000-BCD remove power supply from the actuator.

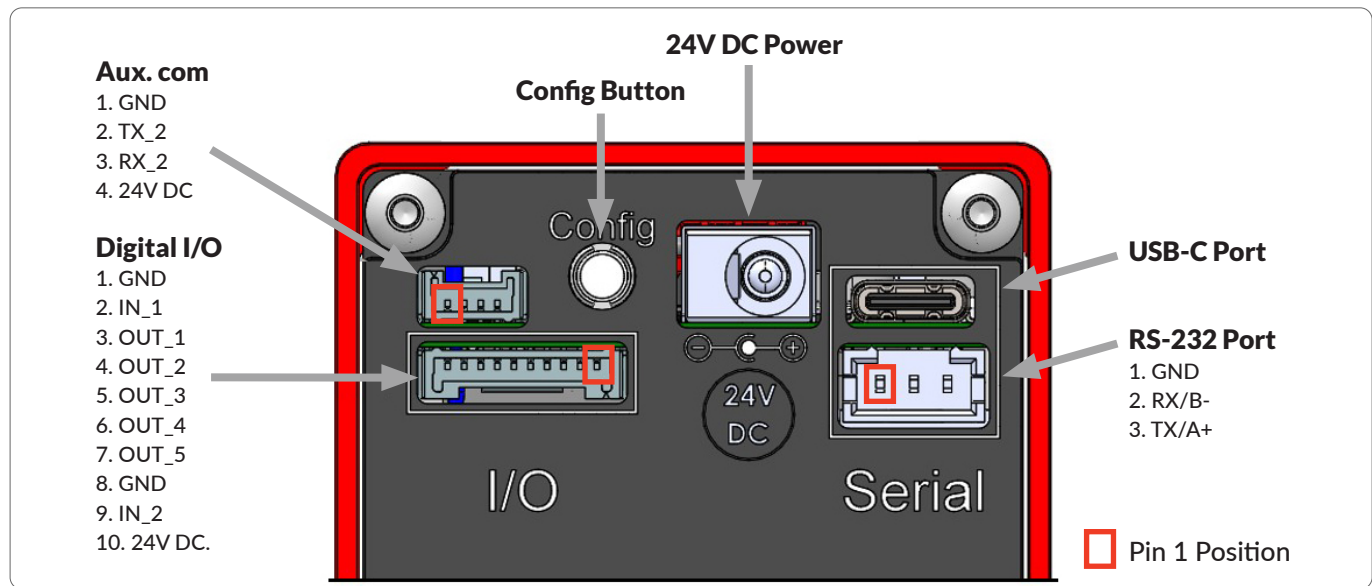
- Use the AFP_CLIENT utility software.
- In the Configuration and Installation (left section) there is a special command. Press the **“GOTO Install (Flat)”** button and the motor shaft of the actuator will go to a ‘flat position’ where the valve can be installed onto the MEA-4000-BCD. **Note that pressing the config button in the back panel the actuator will go to the “flat position”**
- There is no need to do any extra operation once the valve is installed.
- AFP offers a retrofit kit for replacing competitor stream selection valves.



- The MEA-4000-BCD uses precision standoffs with integrated mechanical alignment features to simplify installation. Alignment is built into both the collar and the standoff, ensuring accurate positioning and easy assembly. Select the appropriate part number to suit your application.
- The stream selector valve (AFP or competition) should be aligned using the drive adaptor to the alignment feature, which also points to stream #1 in AFP valves.



MEA-4000-BCD Back Panel



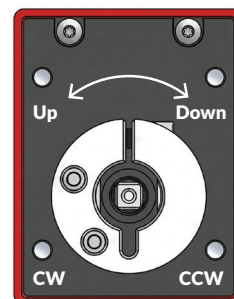
EA00-9010-1090

Bare Digital I/O Cable

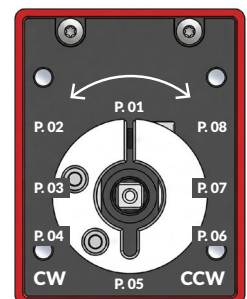
MEA-4000-BCD Digital I/O			
Pin	Position on MEA	Wire Color	Signal
1	Far Right	Brown	GND
2		Red	IN_1 Step
3		Yellow	OUT_1 lsb
4		Orange	OUT_2
5		Green	OUT_3
6		Blue	OUT_4 BINARY_msb
7		Violet	OUT_5 BCD_tens
8		Grey	GND
9		White	IN_2 Digital input 2
10	Far Left	Black	24V DC (OEM only)

MEA Rotation and Port Positions

The MEA rotation operates like a construction drill. Clockwise rotation causes the MEA port number to go up. Counterclockwise rotation causes the port number to go down. This description is based on looking at the view from the shaft point of view.

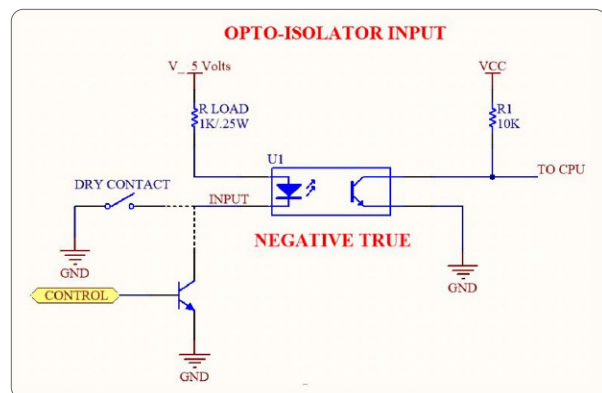


All MEA Actuation



Multipositions

MEA-4000-BCD: STEP Digital Input Signal

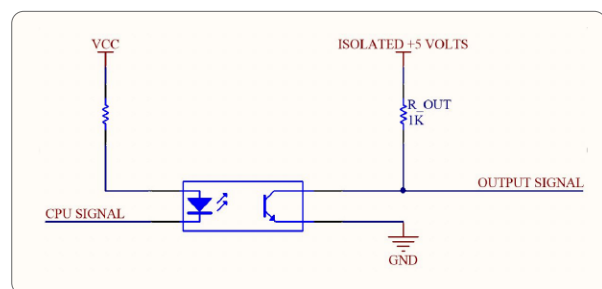


Digital Control Specifications

All Digital Inputs	Opto Isolated
Input current @ 5 Volts DC	5V / 1.0 kΩ = 5 mA
ACTIVE: Open collector	Drive to ground
ACTIVE: Dry contact Close	Short to ground
NOT ACTIVE: Open collector	5 Volts TTL level input
NOT ACTIVE: Dry contact open	5 Volts TTL level input

Note that it is possible to let an input “loading”. Even in a noisy environment false state - **should not occur**.

MEA-4000-BCD: Digital Output Signal



BCD Digital Output

By default the MEA-4000-BCD use the digital output as position indicator.

All Digital Inputs	Opto Isolated
Output current @ 5 Volts DC	5V / 1.0kΩ = 5 mA
ACTIVE: 5 Volts through resistor	+5 Volts at 5 mA
NOT ACTIVE: 0 Volt through transistor	Short to ground

The general Rules to the Interface Integration

Connectivity:

Ground Reference is Critical: On all GC generations, the logic ground pin must be securely tied to the GND to the MEA-4000-BCD GND. Without a shared reference, the GC will not register state changes.

Passive Dry Contacts: The step relay pins on the GCs do not output any voltage. They act purely as an isolated physical switch. The MEA-4000-BCD controller provide its own pull-up voltage.

Selection Mode 8 for GC-8890:

Binary Offset (+1): GC-8890 always start their channel tracking tables at Position 1. Therefore, the binary code 0000 (Actuator Position 0) will always register as stream/ valve sequence Position 1 in the GC method.

Selection Mode 7 for GC-7890:

Binary Offset (+0): GC-7890 always start their channel tracking tables at Position 1. Therefore, the binary code 0001 (Actuator Position 1) will always register as stream/ valve sequence Position 1 in the GC method.

MEA-4000-BCD Bootloader and Power-On:

The MEA-4000-BCD features a bootloader to adapt to various needs and add functionalities for OEM manufacturers. Because it includes a bootloader and supports two types of Agilent GC, here is how the MEA-4000-BCD behaves upon power-on.

The difference lies in the position outputs, as there is a one-position difference between the two GC models. At boot time, the negative-true outputs display the value 00001, which represents position 01 for a GC-7890. After reading its configuration parameters, the MEA-4000-BCD will adjust the position to 00000 if it detects a GC-8890.

MEA-4000-BCD: SERIAL MODE CONFIGURATION

The following are commonly used configuration commands for the AFP_CLIENT utility software. Some examples use the edited button, while others use the AFP Protocol Command Editor. You can also use other communication software and COM port settings at 9600, N, 8, 1.

Open Communication Port:

AFP AFP_CLIENT ver 1.3

COM Serial Port Settings

COM Port: Baud Rate: Parity: Data Bits: Stop Bits: ☒ Open ☐ Close I.D. Number

Changing the Control Mode:

Command Number:014
Parameter: 1,2,7,8
MODE,7: Output BCD (GC-7890)
MODE,8: Output binary (GC-8890)

U01CMD_H_014=MODE,7
ACK

AFP Protocol Command Editor

I.D.: Return Param: Function No: Function Parameter:

U01CMD_H_014=MODE,8
ACK

AFP Protocol Command Editor

I.D.: Return Param: Function No: Function Parameter:

Changing the Port Number:

Command Number:015
Parameter: 04,08,16
For control VALVE number of port

Nb_Port (015) GET
Selection Mode (014)
Control Mode (010)

Changing the Torque Mode:

Command Number:019
Parameter: MODE,1
For High Torque /low speed
Parameter: MODE, 2
For Mid Torque / mid speed input

Torque Mode (019)

U01CMD_H_019=MODE,1
ACK

AFP Protocol Command Editor

I.D.: Return Param: Function No: Function Parameter: