

MEA-2000 in Digital Control

Description

This technical note is a quick-start application guide for the out-of-the-box MEA-2000 and an AFP MRV two-position valve. A two-position actuator can be controlled via digital input or serial communication. This note covers the digital control aspect help by the AFP_CLIENT utility software to configure the MEA-2000.



Characteristics

- 30% Smaller footprint vs previous model(4.20" x 2.125" x 2.75").
- Intelligent – Detects and adapts to the number of ports in a two-position valve by initialization process. Easy switching from 4 ports to 14 ports with an auto configuration.
- No need for multiple actuator models for the different types of valves: Compatible for MRV and RV rotary valves.
- Two modes – fast actuation or high torque set by serial command.
- CE approved.
- Compatibility of OEM protocols on request.
- Direct replacement of 2-position electrical actuators in the market.
- AFP_CLIENT software for easy operation and development of the actuator.
- Multiple run time information: track the number of boots, configurations, actuations, etc.
- Energy friendly: low standby power for portable applications*. *on demand.

Serial Communication Features

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

MEA-2000 Default Configuration

Control Mode: Digital	CMD_010
Selection Mode: 2 Inputs	CMD_014
Digital Input polarity: Normal	CMD_017
Torque: High	CMD_019
ID numbSecondary protocol: er: 01	CMD_020
ID number: 01	CMD_009

Serial Communication Features

SPECIFICATION	DESCRIPTION	
8-bit Microcontroller and configuration Memory		
USB 2.0	Full Duplex	9600 Bauds
RS-232	Full Duplex	9600 Bauds
RS-485 (2 wires)	Half 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.

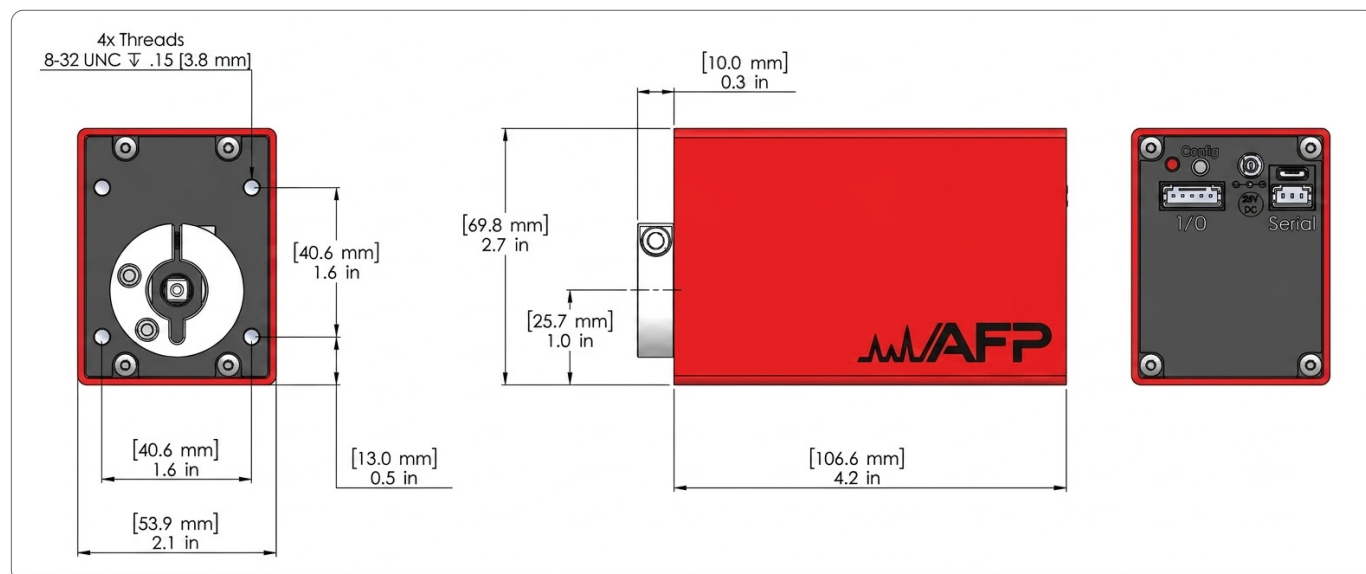
Digital Input Specifications

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

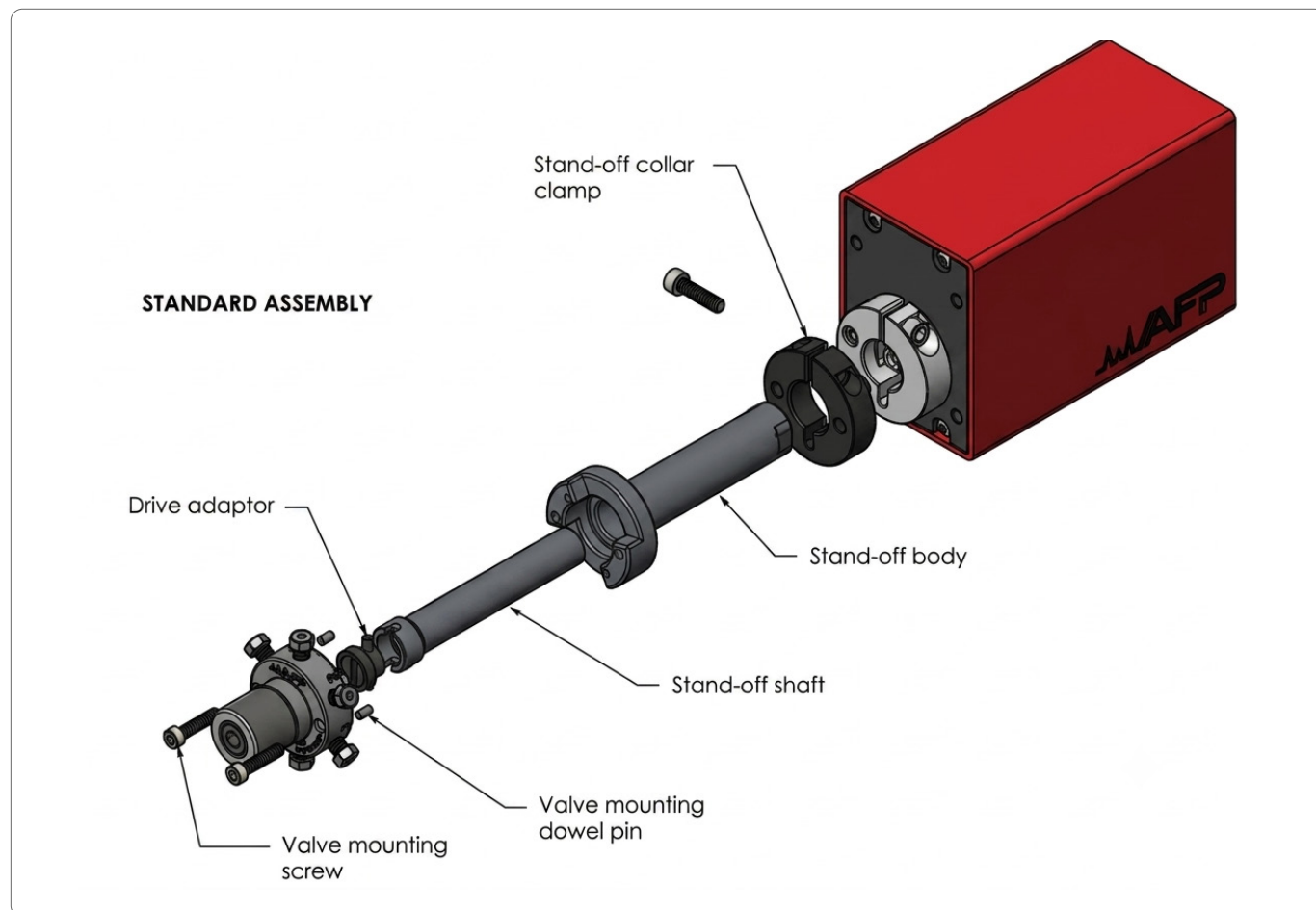
Digital Output Specifications

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

Dimensions



Standard Assembly

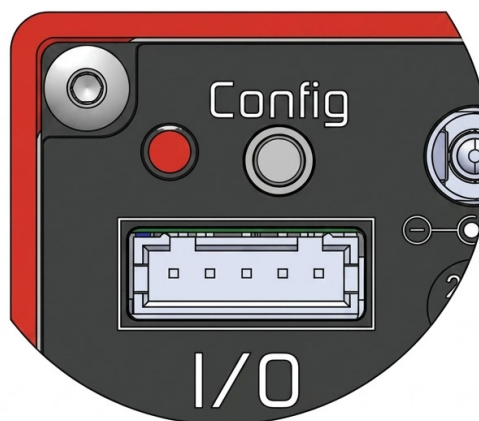
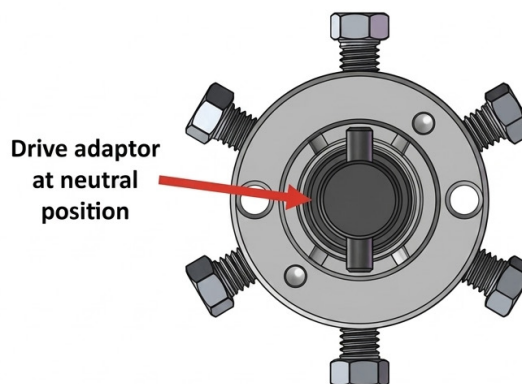


VALVE INSTALLATION

Before Starting

For your own safety, before installing or changing a valve on the MEA-2000 remove power supply from the actuator.

- If there is a valve already on the MEA-2000, remove the rotatory valve by unscrewing the two valve mounting screws from the standoff/close mount valve seat.
- If desired, remove dowel pins ($\varnothing 3/32'' \times 3/16''$) from the previous rotatory valve and change them for the dowel pins provided with your new rotatory valve.
- Align the rotor using the drive adaptor to the neutral position, as shown in the image.
- Place the new rotatory valve with its drive adaptor on the MEA-2000 standoff / close mount valve seat. Be sure to line up the valve until the mounting screws can be re-installed, this will align the shaft of the actuator with the valve and standoff.
- Using the valve mounting screw, fix the valve assembly on the standoff/closemount assembly. Tighten with $7/64''$ Allen key, mounting screws to 30 lb-in (3.3 N-m).



Tuning a MEA-2000

Configuring the Electrical Actuator

When a valve is changed, you need to inform the MEA-2000. The MEA-2000 controller needs to know the type of valve to deal with. The easiest way to do it is to press the self-adjustment button.

The Self-Adjustment consists of:

1. Six actuations with hard stroke ending to sense the valve hard limit.
2. Two fine tuning actuations to save and confirm a successful configuration.
3. The MEA-2000 will go to the specified port by its control mode and input status.

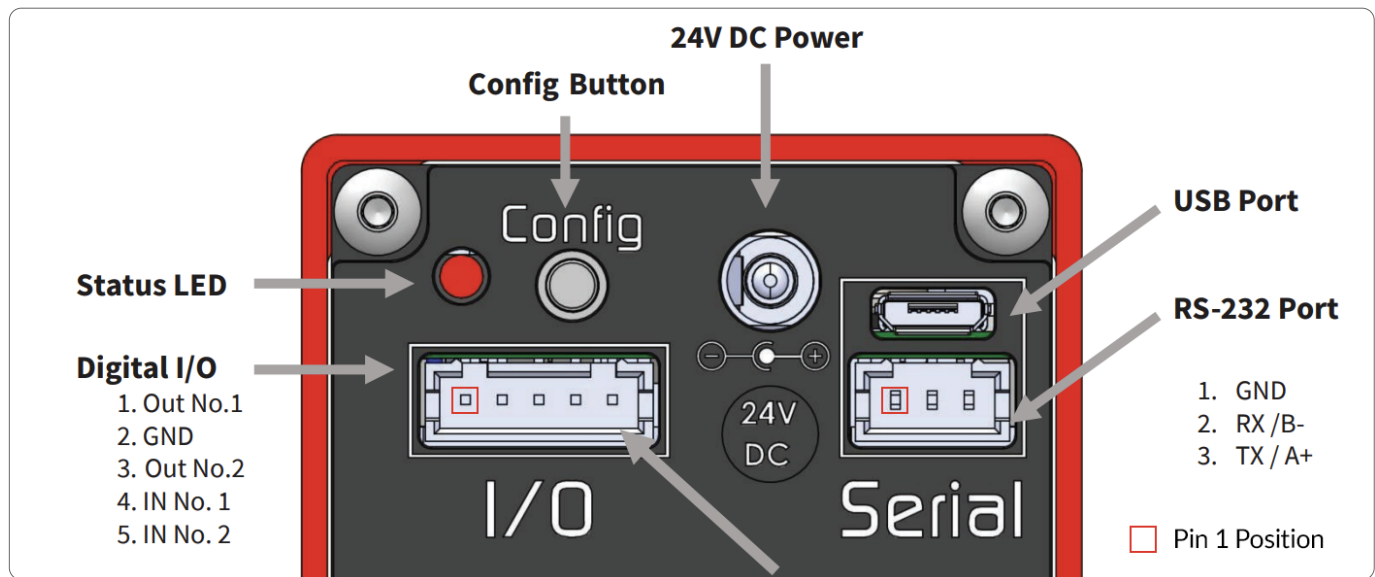
STATUS LED

Waiting mode is active if the MEA-2000 is waiting the user to press the configuration button. Usually the waiting mode append when the MEA-2000 does not 'see' a valve in the self-adjustment process or when the firmware is updated.

In the waiting mode, the configuration LED is blinking fast. Otherwise, in normal operation the configuration LED is blinking slowly.

Note: If no valve is present, the MEA-2000 will start the initialization process and then return to the installation / flat position.

MEA-2000 Back Panel

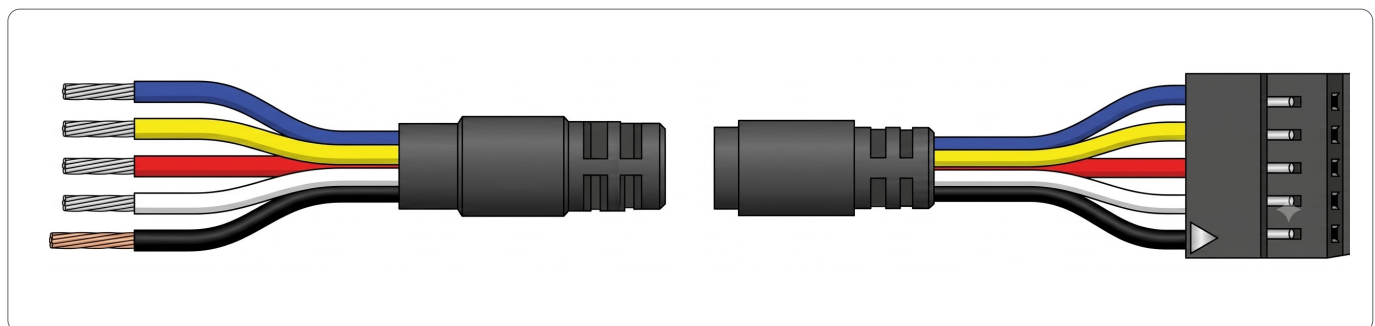


Digital Input / Output Description

PIN #	Name	Note	Color Code
1	DIGITAL OUTPUT #1	Digital Isolated output	Black
3	DIGITAL OUTPUT #2	0 Volt	White
2	GND	Digital Isolated output	Red
4	DIGITAL INPUT #1	Digital Isolated input	Yellow
5	DIGITAL INPUT #2	Digital Isolated input	Blue

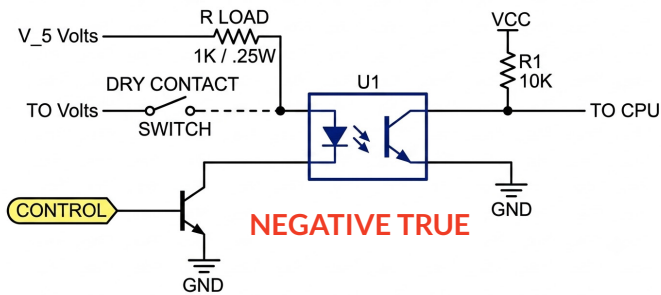
AFP I/O Cable

Part number: EA00-9010-1010



MEA-2000: DIGITAL INPUT SIGNAL

Opto-Isolator Input



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: See CMD_018 (input polarity) to reverse the MEA-2-2000 actuation

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

Selection Mode: 1 Input

Signal Input No 1	Position
Not Active: Dry Contact Open	Serial port pin
Active: Dry Contact Close (Permanent)	Position 2 is selected (CCW)

Selection Mode: 2 Inputs

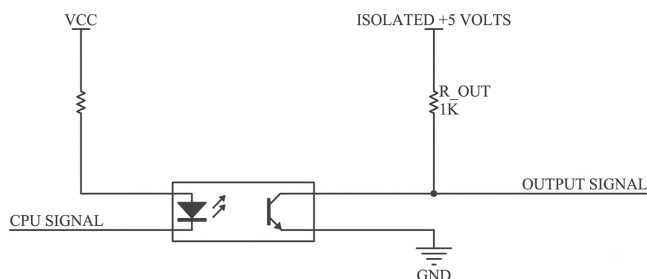
Signal Input No 1	Signal Input No 2	Position
Not Active: Dry Contact Open	Active: Dry contact close	Position 1 is selected (CW)
Active: Dry contact close	Not Active : Dry contact open	Position 2 is selected (CCW)

IMPORTANT:

The AFP command CMD_010 is used to set the MEA-2000 in DIGITAL control mode.

The AFP command CMD_014 is used to set the MEA-2000 Selection mode.

MEA-2000: Digital Output Signal



Multi Purpose Digital Output

By default the MEA-2000 use the digital output as position indicator. It is also possible to control the digital output with the AFP CMD_232.

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

MEA-2000 Position	Out No. 2	Out No. 1
A or 1	0 Volt	+5 volts
B or 2	+5 volts	0 Volt

MEA-2100: SERIAL MODE CONFIGURATION

Here 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
COM8	9600	None	8	One		01

Changing the Control Mode:

Command Number: 010
Parameter: MODE, SERIAL
For control by the serial comm.
Parameter: MODE, DIGITAL
For control by digital input

Control Mode (010) MODE,DIGITAL

```
U01CMD_H_010=MODE,DIGITAL
_ACK_
```

AFP Protocol Command Editor

I.D.:	Return Param:	Function No:	Function Parameter:	
01	H	010	=MODE,DIGITAL	Send Command + CR LF

Changing the Selection Mode:

```
U01CMD_H_014=MODE,2
_ACK_
```

AFP Protocol Command Editor

I.D.:	Return Param:	Function No:	Function Parameter:	
01	H	014	=MODE,2	Send Command + CR LF

Selection Mode (014) MODE,2

Command Number: 014
Parameter: MODE,1
For control using only Input no. 1
Parameter: MODE,2
For control using both digital input

Changing the Torque Mode:

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

Torque Mode (019) 1

```
U01CMD_H_019=MODE,1
_ACK_
```

AFP Protocol Command Editor

I.D.:	Return Param:	Function No:	Function Parameter:	
01	H	019	=MODE,1	Send Command + CR LF