

# Micro Force V+F3

ver. 1.1



fig 1. V+F3 Controls



fig. 2 Control with Pan Arm Adapter accessory p/n 1156



## Micro Force V+F3

The Micro Force V+F3 is the newest member of the analog Microforce family. It is used to control analog zoom motors mounted externally on the zoom lens, or the internal zoom motors of video lenses. It features the same force sensor technology which has made Microforce controls the industry standard for more than a quarter century. This newest update replaces the venerable 10 turn zoom sensitivity control with a virtually indestructible control knob and bright digital display.

The classic ergonomic design provides a rounded grip for comfortable all-day use and also offers a convenient attachment point for its mating Pan Arm adapter. Its housing, machined from solid aluminum alloy, protects the control from mechanical abuse and assures years of reliable operation. An integral camera run switch allows remote run/stop operation for both Film and Video cameras.

The V+F3 may also be used to provide the zoom function in conjunction with the FI+Z system as well as interface to professional Canon and Fujinon video lenses having 12 or 20 pin Hirose connectors.

The V+F3 unit operates over an input voltage range from 11 to 28 volts (30V max.). Polarity protection protects the electronics from improper power connection. A series of molded "Y" cables is used to interface with the zoom motor and the accessory connectors on most motion picture cameras

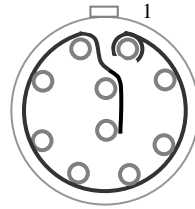
1. Power Connections. The Micro Force may be powered using the following types of cables:
  - a. "Y" -Cables: (product series 1100) for specific film and video cameras. Micro Force power is drawn directly from the accessory socket on the camera.
  - b. Video Cables for Canon and Fujinon. Power is drawn from the 12 pin Hirose connector on the lens.
  - c. Zoom cables (series 4540, 4440) for use with the FI+Z system.
  - d. Auxiliary power cables (product series 1128-1130) may be used in conjunction with "Y" cables to power the control directly from a battery.
2. Power requirements. The Micro Force operates over a voltage range of 11 - 30 VDC (max). Idle current is 55mA at 24 VDC or 95mA at 12VDC. The maximum current drawn under stalled motor conditions is 1.2A @ 24V (typ.) or 2.4A at 12V. The actual current requirement is proportional to the operating torque and the current limit set on the circuit board.
3. Control functions.
  - a. The **Maximum zoom speed/ Sensitivity control** is located at the bottom of the control. The adjustment range is from 00 to 99 in the digital display, corresponding 10 turns of the knob.
  - b. The zoom speed and direction is controlled by applying finger pressure to the **red joystick knob** either towards the top or bottom of the control.
  - b. The **Direction switch** reverses the motor rotation.
  - c. The **Camera Run switch** has 3 positions; center Off, Toggle On (away from the joystick) and Momentary On towards the joystick). The Toggle On position is for cameras requiring a continuous signal to run (i.e. Arri 12V, Panavision, Aaton), while the Momentary On is for cameras requiring a short pulse to change from run to stop (i.e. Arri 24V, Moviecam, Sony ).

- d. The **Zap** switch sets the control to maximum speed. Pressing this momentary switch overrides the zoom speed setting, allowing the lens to be returned quickly to a desired position.
- e. The **Servo/Manual** switch is placed in the manual position to allow the zoom ring of the lens to be driven manually.

7. Technical Information and Service Guide

- i. LEMO 10 pin-out.  
Type EGG2B310

- 1. - Tach
- 2. + Motor
- 3. -Motor
- 4. +Tach
- 5. - Battery Power
- 6. +Battery Power
- 7. Video Reference input
- 8. Camera Run active high
- 9. Camera Run active low
- 10. Zoom Command

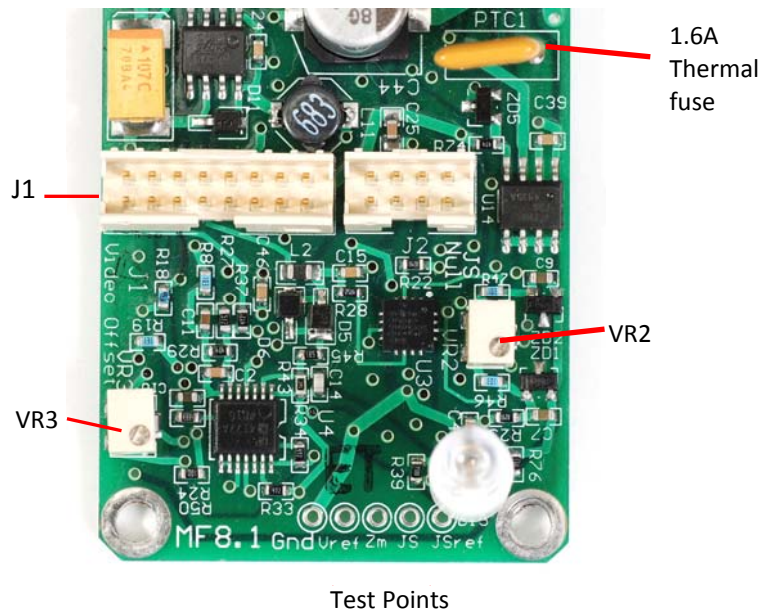
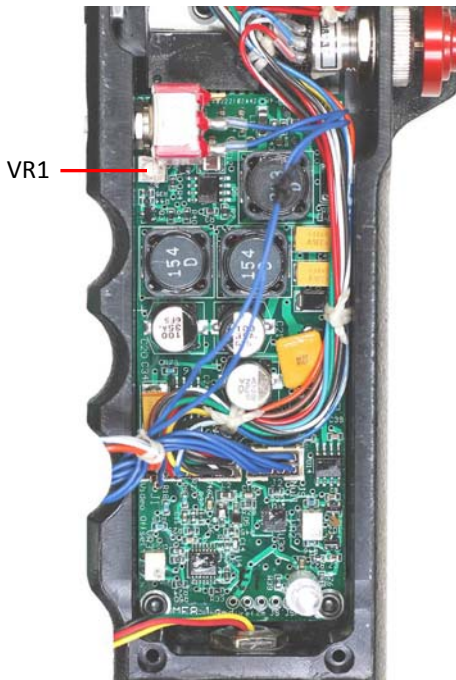


- ii. Analog Motor Pin-Outs. Motor receptacle view.

- 1. Tach (-)
- 2. Tach (+)
- 3. Motor (-)
- 4. Motor (+)

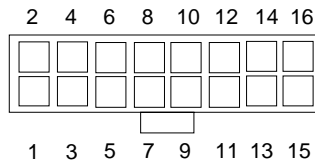


- iii. Circuit board showing test points and potentiometer locations.



iv. J1 16-pin Berg Connector Pin Functions

1. Motor Direction Switch 1
2. Motor Direction Switch common
3. Motor Direction Switch 2
4. –Joystick
5. + Joystick
6. Manual/Servo
7. Joystick output
8. – Motor
9. – Tach
10. + Tach
11. n/c
12. Video Reference in
13. Zoom Command out
14. +Battery Power
15. Switched GND for R/S
16. – Battery Power



- v. **Testing and Adjustment procedures.** CAUTION: These tests involve measuring voltages on the pins of integrated circuits and /or test points with very fine spacing. Accidentally shorting adjacent pins MAY DESTROY the devices. Only a skilled technician should undertake these tests. The test points are grouped at the bottom of the circuit board as shown in fig. 7.iii. Use fine tipped voltmeter probes to make contact with the test points. All voltages are measured relative to the GND pad.
- a. Power supply operation. The digital Micro Force has three switching power supplies; controlled by IC's U15, U16, and U17. All three supplies are active when the Micro Force is driving a digital motor. U15 generates both +3.3 and -3V, U16 generates +9V and U17 generates +18V for  $V_{in} < 18V$ , and  $V_{in}$  is passed through if  $V_{in} > 18V$ . To minimize current consumption, when the unit is used in the Analog mode for generating a Zoom command signal to control the FI+Z zoom channel or operate the internal servo of a video lens, the +18 V(U17) supply and the motor drive circuitry (U1 and U2) is turned off. Input polarity protection is provided by U14.
  - b. To test the power supplies, power the unit with a 12VDC 2A source. PTC1 is a 1.6A thermal fuse which protects the unit from catastrophic damage. It is located next to test point TP2. If it is hot to the touch there is a short circuit or damaged component. This fault must be remedied before proceeding further.

The table below lists the nominal voltage outputs from the internal power supplies.

Voltage	Designator	IC P/N	Test Point
$18 \pm 0.5$	U17	LT1370HV	C37
$9.0 \pm 0.3$	U16	LM2675-5	C33
$+3.3 \pm 0.1$	U8*	LTC1877	C26*
$-3 \pm 0.5$	U8*	LTC1877	C77*

Voltages which are outside of the stated tolerance may indicate either a defective IC, a faulty passive component (capacitor, inductor, or diode), or an improper load. It is strongly suggested that the factory service department or a designated PCS service representative perform board level repairs.

- c. Null Adjustments. The following procedures are used to eliminate motor creeping when operating pressure is not applied to the joystick. The procedure has two parts: null adjustment for **joystick calibration** and **analog mode offset**. The null adjustment for the joystick must always be performed first.

A digital voltmeter with 0.1mV resolution is required.

#### I. Joystick Calibration

1. Remove the four screws that attach the cover to the chassis. Open the cover.
2. Apply power to the Micro Force control.
3. Make sure nothing is contacting the red joystick knob.
4. Set the voltmeter to read DC millivolts. Measure the voltage difference between the test pads "JS" and "JSref".
5. Adjust the Joystick Null pot VR2 until the voltmeter reading is  $<0.2\text{mV}$ .

II. Video Offset Calibration. This calibration can only be performed when the Micro Force is connected to either a Video lens, FI+Z Hand Unit, or Radio Micro Force unit.

1. Connect the Micro Force to a video lens, FI+Z Hand unit, or Radio Micro Force with a matching cable
2. Set the Speed Pot to "99".
3. Set the voltmeter to read DC millivolts. Measure the voltage difference between the test pads "JS" and "JSref".
4. Make sure that nothing is contacting the red joystick knob. Adjust the Video Offset pot VR3 until the voltmeter reading is  $<0.2\text{mV}$ .

- d. Current Limit adjustment. The current limit adjustment pot VR1 determines the maximum motor torque both during calibration and normal operation. The operating torque is approximately 40% higher than the calibration torque. The stall current through the motor is factory set to 0.90A . Turning VR1 anti-clockwise increases the maximum motor torque.

fig. 5 Micro Force with FIZ Hand Unit. The V+F3 can be used to control the zoom function in conjunction with the HU3 Hand Unit. Bracket 4336 attaches the V+F3 to the Hand Unit and cable p/n 4540 makes the required electrical connection.



## V+F3 Micro Force Control and Accessory List

<u>Product Number</u>	<u>Description</u>
1110	Micro Force Control V+F3
1128	Auxiliary Power Cable 12V (4 pin XLR)
1129	Auxiliary Power Cable 24V (3 pin XLR PV polarity)
1120	Y cable for 12V Arri Cameras
1121	Y cable for 24V Arri Cameras
1127	Y cable for Anton Bauer Power tap
1138	Canon analog video cable 20-pin Hirose
1140	Y cable for Sony/Panasonic HD/ 12-pin Hirose
1141	Canon Video Cable 12-pin Hirose
1134	Extension Cable 25'
1135	Extension Cable - custom length
1155	Articulating Pan Arm Bracket for Digital Micro Force and VF2
1158	Fujinon Video Cable 12-pin Hirose
4336	Bracket to attach V+F3 to HU3 Hand Unit
4540	Cable HU3 to V+F3 ( for V+F3 bracket mount)