OFFICINASTELLARE
WORKSHOP OF THE STARS

FM100 - Operation manual

rev. 01 - 20151211 - author: Alessio Galliazzo

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1. General description:

The new Officina Stellare FM100 flip mirror with integrated off-axis guide is designed to be operated by PC serial port (RS232) or by on-board switches.

a) Operation:

The flip mirror firmware is designed to move the mirror in 2 different position:

1. 0 degrees where mirror is NOT intercepting the light (mirror is on the top of the box)
2. 45 degrees where mirror is intercepting the light.

Every time a command is issued by a switch or by the PC software, the flip mirror start an automatic homing procedure to ensure a fixed start point to count degrees. This is also useful in case of a power failure happen during the mirror movement.
The state of the flip mirror is reported to PC software.

b) FM100 Specifications:

Power supply:

Voltage	12Vdc
Current requirements	1A

Controls:

On board RS232 female connector with dedicated control software

On board switch (0-45 degrees control)

On board ON/OFF switch to switch of LEDs

Indications:

On board power LED (Red)

Mirror position indication through GREEN/RED LED

c) LEDs status reporting:

Normal operation with mirror at 0 degrees:

Power LED	RED – Fixed on
Status LED	RED – Fixed on

Normal operation with mirror at 45 degrees:

Power LED	RED – Fixed on
Status LED	GREEN – Fixed on

Moving:

Power LED	RED – Blinking
Status LED	Depend on last position

Error:

Power LED	RED – Fixed on
Status LED	YELLOW – Blinking

2. Software operation:

FM100 is designed to be operated remotly by software. The software is shipped within this manual and can be installed on any PC running Windows 7 or newer with an available serial port (USB to serial adapter can be used too).

a) Main software window

The main control windows allow you to operate the FM100 unit.

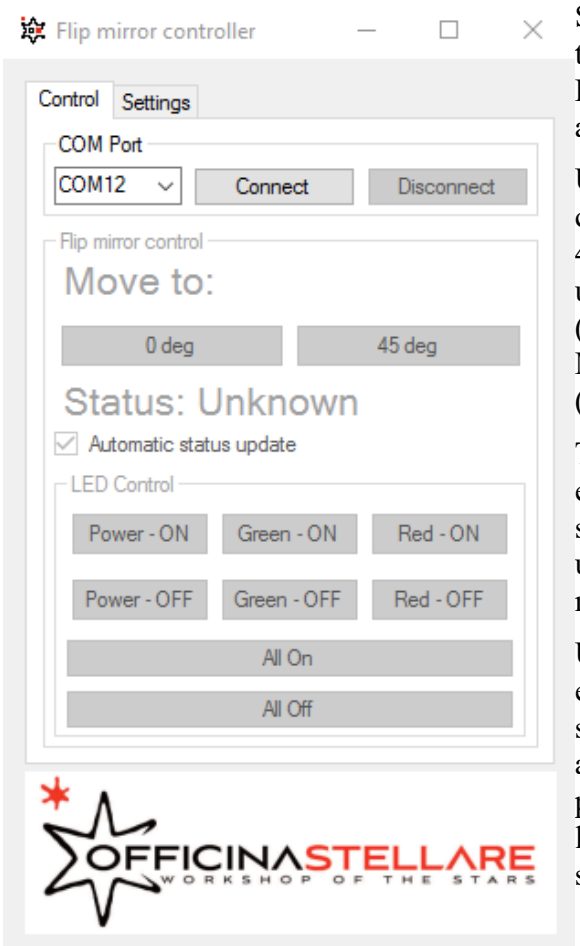

Fig. 1: FM100 Control window

Starting from top you can find the COM port selector that is used to select wich COM port is connected to FM100 unit, the connect and the disconnect button that are self explanatory.

Under the "Flip mirror control" group you have a couple of button used to move the flip mirror to 0 or 45 degrees. The status label will automatically be updated and report the current flip mirror status (IDLE, START HOMING, HOMING, START MOVING, MOVING TO TARGET) and the position (0 or 45 degrees).

The "Automatic status update" checkbox is used to enable (checked) or disable (unchecked) an automatic status update every 1 second. This help the user to understand what the FM100 unit is doing in a precise moment.

Under the "LED Control" group you can switch on/off each single LED. This command will override the switch command so, during remote operation, you can anytime turn off the LEDs. The LEDs are low power/low intensity LED but, in a dark environment like observatories, the user may need to choose to switch off every light source.

b) Settings software window

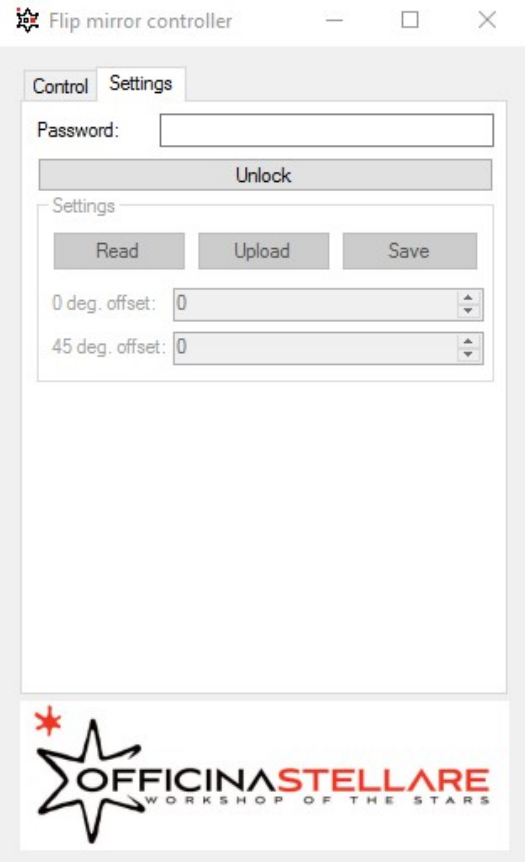

Fig. 2: FM100 Setting window

The setting window is used by Officina Stellare staff to set the correct inclination of mirror for each flip mirror position.

Every single FM100 unit leaving Officina Stellare factory is tested and calibrated over an optical bench to ensure that the mirror is at exactly 45 degrees.

The window is password protected and cannot be operated by user.

WARNING: Changing settings without support of Officina Stellare team is NOT ALLOWED! Modifying these paramenters without knowing what to do can destroy the flip mirror and VOID the warranty.

3. Hardware operation

Fig. 3: FM100 connection/drive panel

On bottom side you can see the bottom panel of FM100.

The top round connector is used to power the FM100 unit. This match with the supplied cable. Cable has a 6.3A fuse to protect from short-circuit.

Te bottom connector is a standard DB9 Female connector. Please note that the serial cable MUST be screwed to ensure a good contact between the DB9 Female and DB9 Male.

The left switch is a 2 position switch used to turn on/off LEDs indicator (see the label on the FM100 unit). The LED under this switch is the power LED.

The right switch is a 3 position self-returning switch used to command the mirror to 0 degrees (up) or 45 degrees (down) position. Under this switch there are the status LED. As described chapter 1.c when this LED is green the mirror is in 45 (down) degrees position, when red the mirror is in 0 degrees position (up).

4. Mechanical informations:

Mechanical data:

Mechanical meausres:	120x130x138mm
Overall measures:	196x138x201mm
Backfocus w/o adapters:	138mm
Backfocus OAG from OUT port:	40mm
Clear aperture IN port without adapter:	80mm
Clear aperture OUT port without adapter:	80mm
Clear aperture 90° port without adapter:	80mm
Illuminated wiev to 90° port:	70mm
OAG optical axis prism distance to optical axis inserted:	26mm
OAG optical axis prism distance to optical axis extracted:	55mm
OAG obstruction edge prism distance to optical axis inserted:	16mm
OAG optical axis prism distance to optical axis extracted:	45mm
Weight without adapters:	2200gr

Optical data (Flat mirror):

Mirror size:	100x100x10mm
Surface flatness:	λ/10
Substrate:	Fused silica
Coating:	Enhanced Alluminu
Coating Specification	Ravg >95% @ 450-650 nm

Optical data (Prism):

Length of Hypotenuse (mm)	28,3
Length of Legs (mm)	20,0
Surface Flatness	λ/4
Substrate	N-BK7
Coating	VIS 0° & Aluminized
Coating Specification	Hypotenuse: Ravg > 85% @ 400 - 700nm Legs: Ravg ≤ 0.4% @ 425 - 675nm
Ray Deviation (°)	90

Following some figure about mechanical dimension and OAG positions.

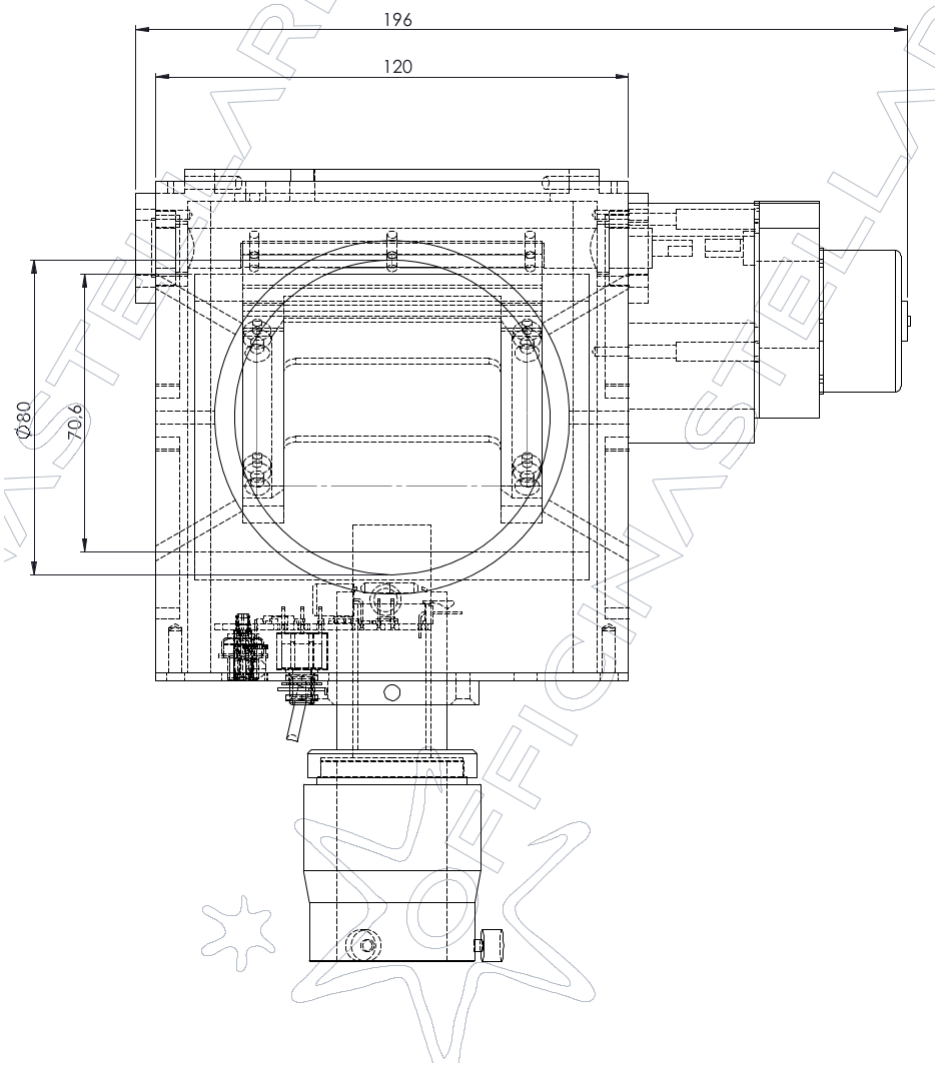

Fig. 4: FM100 - Front View

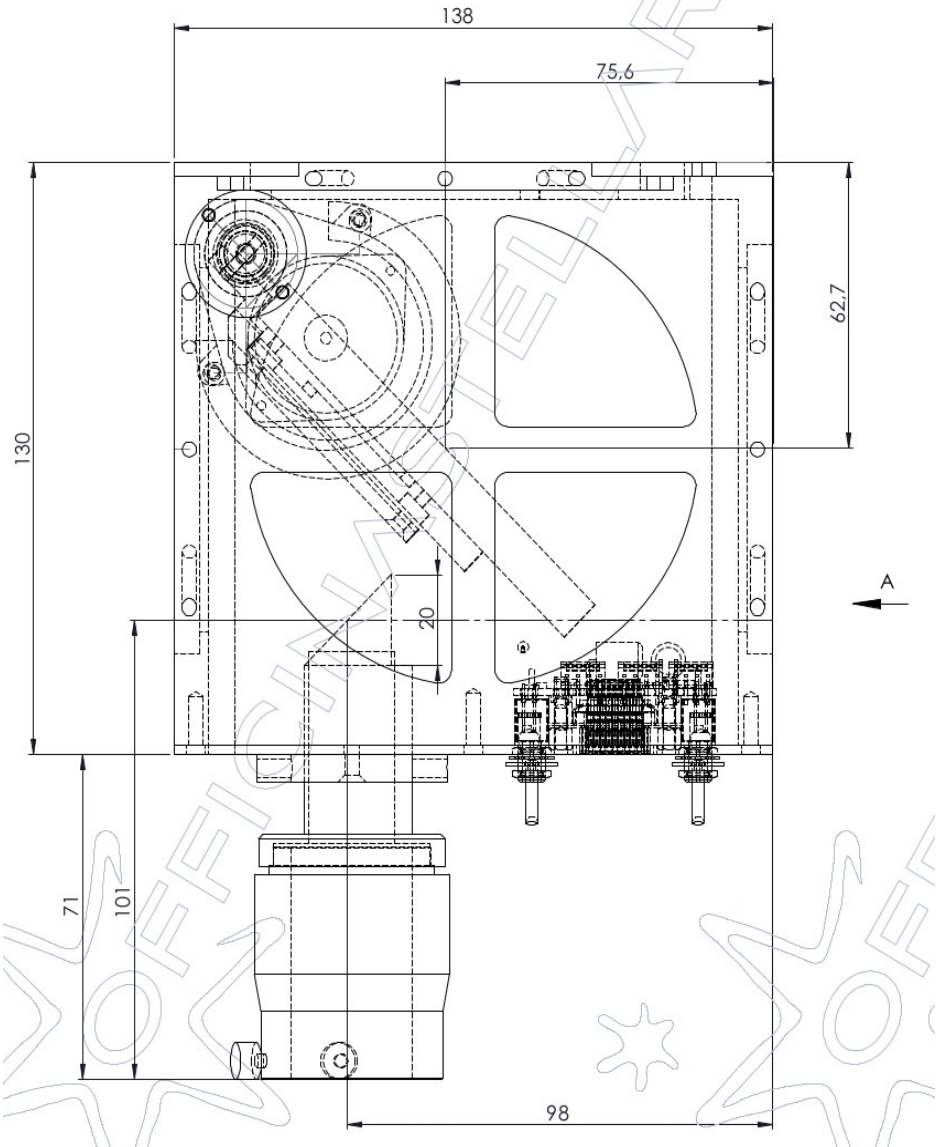

Fig. 5: FM100 - Side view

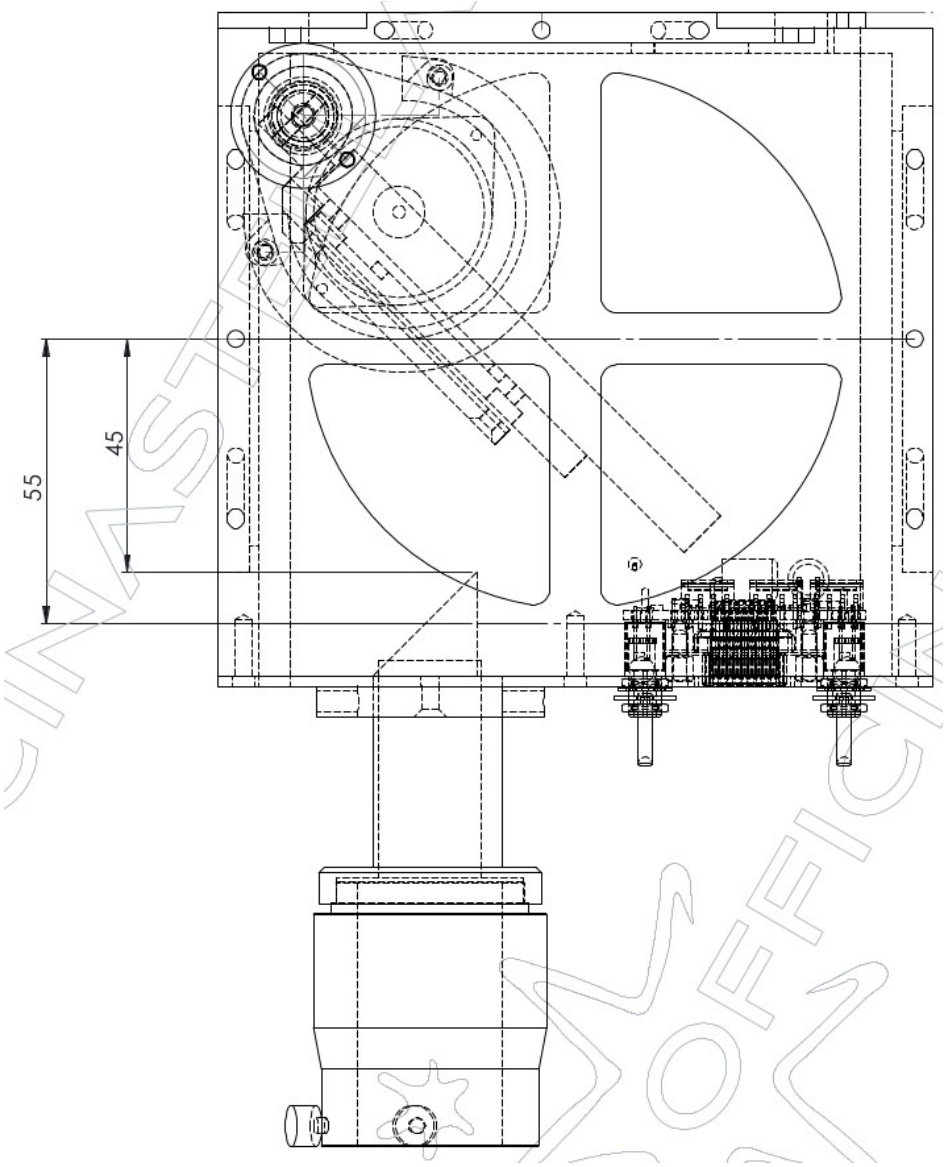

Fig. 6: FM100 - OAG Fully extracted

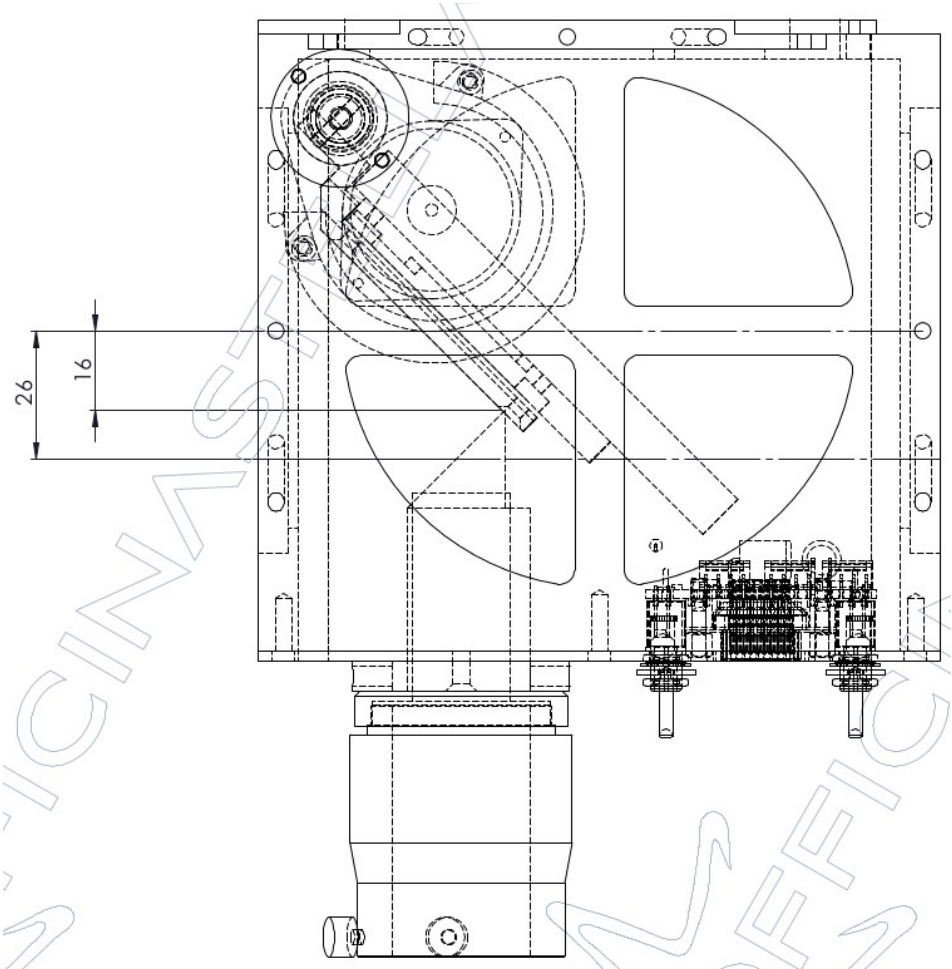

Fig. 7: FM100 - OAG Fully inserted