Equatorial Mount

EM-400

Temma 2M

INSTRUCTION MANUAL

TAKAHASHI

Thank you for your purchase of the EM-400 Temma2M mount. This highly sophisticated mount is perfectly suited to any number of photo/visual applications. In order for you to be able to operate the EM-400 Temma2M to the limit of its capabilities, thoroughtly read this manual and familarize yourself with the correct operation of its many features and functions. Properly used, the EM-400 will deliver a lifetime of operation.

⚠ WARNING

NEVER ATTEMPT TO LOOK AT THE SUN DIRECTLY THROUGH THE TELESCOPE OR FINDER. DOING SO WILL CAUSE INSTANT BLINDNESS DUE TO THE INTENSE LIGHT AND HEAT OF THE SUN.

⚠ CAUTION

- When you place the tube assembly into the tube holder, do not over tighten the tube holder clamps. Doing so could distort the telescope tube and cause the telescope to decollimate.
- Place the mount on the flattest ground at the observing site. It is important that the tripod be set on the flattest ground available to provide a stable base for the mount.
- Exercise great caution when sliding the 8 kg counter weights on to the counter weight shaft and after this has been done attach the safety nut to the bottom of the shaft to keep the counter weights from coming off the shaft. The counter weight could cause severe damage to anything it falls upon.
- Never under any circumstances allow the mount to get wet from rain. Moisture will short circuit the electronics and wash out the lubricant. If rain threatens, immediately take the mount down or cover it with a waterproof cover in the event the onset of the rain is rapid.

CONTENTS

Specifications

Equatorial Mount

Type:	German equatorial with Temma2M go-to system built-in
R.A. slow motion:	Round worm wheel [180:1] by quartz controlled stepping motor
Dec. slow motion:	Round worm wheel [180:1] by quartz controlled stepping motor
Azimuth adjustment:	± 10° finely with dual screws 360° freely with the dedicated turntable
Altitude adjustment:	0° ~ 47° [ML] 15° ~ 58° [HL]
Loading capacity:	35kg (77 lbs)
Gross weight:	Head unit: 22.3kg (49 lbs) Base unit: 5.2kg (11 lbs) Weight shaft: 2.0kg(4.4 lbs)
Polar alignment scope	Built-in, 11x, 3' setting accuracy Scale pattern, quick reference type, good until 2040 in the Northern Hemisphere with illumination and bubble level
Counter-weight	8kg x2

Motor Drive System
【Temma2M】

Drive System :	Dual axes, quartz control, driving frequency: 240pps N/S, Star/Sun switching by hand controller
Usable Area :	World-wide, but high latitude is limited as mentioned in the Equatorial Mount section
High Speed Drive :	Approx. 500x sidereal
Correction Speed :	RA: 0.11 ~ 1.99x Sidereal
(manual operation)	Dec: ± 0.15 ~ 14.65 arc sec/sec by 1.5 arc sec/sec stepless by the speed control provided on the control pad
Mode indicator:	High speed operation - red light Normal operation - green light
Power Source :	DC12V
Power Consumption :	Sidereal rate Approx. 0.8A High speed on both axes 3.5A Start 5.1A
Go-To Operation :	By a PC
"Go-To" Disc:	Pegasus 21 or other compatible software
Accessory :	RS232C cable (Temma2M auto-guider cable for U.S.A.)

Operational temperature: -5 ~ +30˚C

These specifications are subject to change without notice.

Layout of the EM-400 Temma2M Equatorial Mount

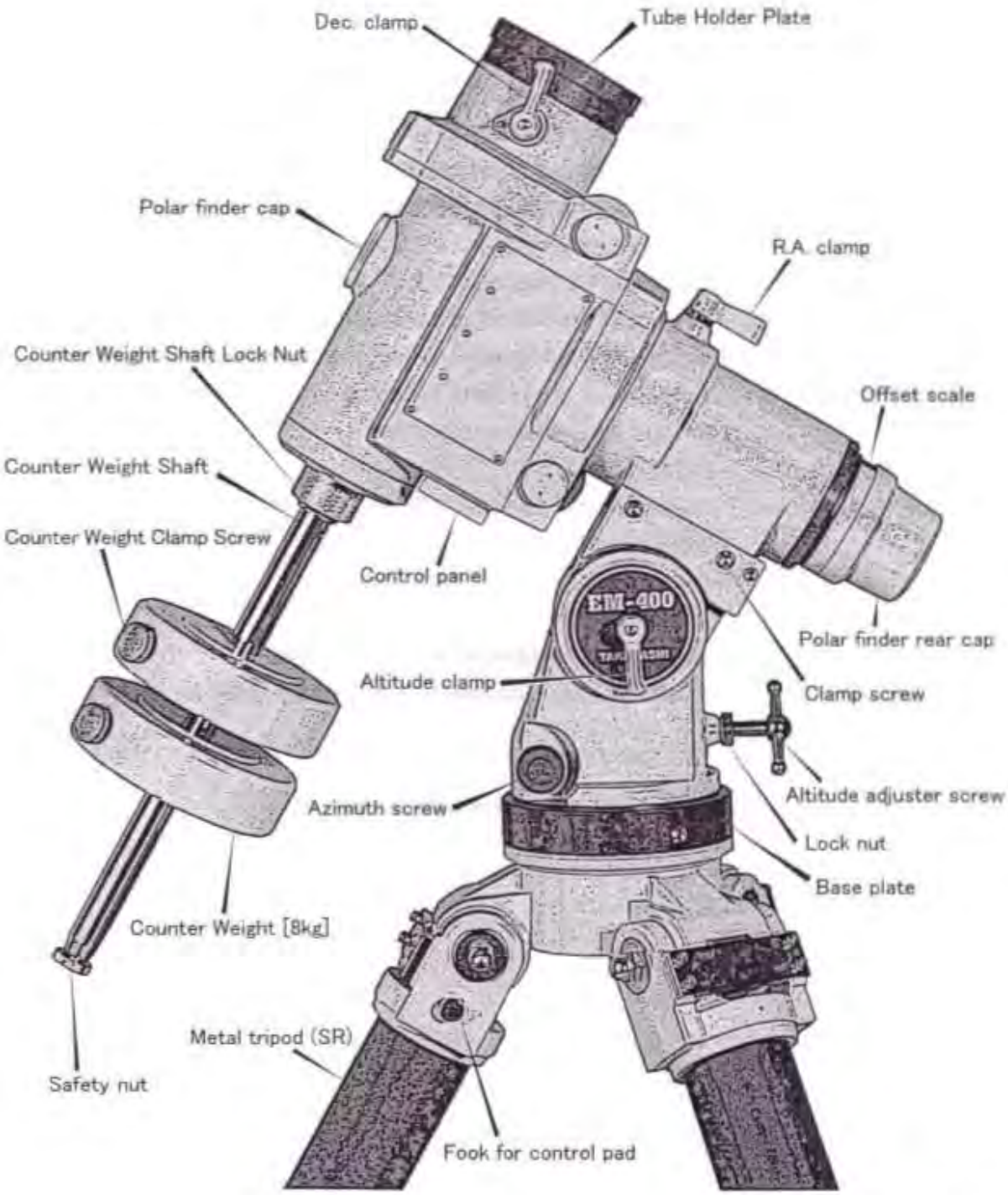


Fig. 1

Features of the EM-400 Temma2M Mount

* Sidereal drive rate employs 240pps quartz controlled pulse motors for steady viewing at very high magnification.

* Modular system insures greater portability breaking down into three parts: R.A. head, base and counter weight shaft.

* More rigidity than the NJP by using the worm wheel of the same diameter.

* The 11x magnification of the polar alignment telescope allows for more accurate polar alignment.

* Uses a flange connector to attach the mount to the tripod that allows 360o rotation for easier polar alignment.

* The encoders are built in to the the mount to eliminate cables and allow the EM-400 Temma2M to be used without having cables wrapping around the mount when it is used.

* The control box cables are attached to a recessed control box in the base of the RA assembly to keep the control cables from being twisted.

* The tube holder base is provided with the four hole pattern of the NJP as well as the two hole pattern of the EM-10/200 mounts to provide greater flexibility and allow any Takahashi telescope to be mounted.

* Each counter-weight is provided with two locking screws to provide better locking of the weight to the shaft.

* The EM-400 Temma2M can be used either the wooden or adjustable metal tripods.

Layout of the Control Panel

■ Control Panel

Powe[LED] :

When the power switch is slide to the On position the LED turns on and the mount is activated.

P-Light Control :

When the Power Switch is turned on, the illuminator for the polar alignment telescope system is turned on.

The brightness of the illuminator can be change by carefully turning the P-Light control slotted screw very carefully with a plastic screw driver. Once the brightness is set, the set screw should be left alone.

DC 12v :

Connect the power cable supplied with the mount to a power supply 12vDC by attaching the red alligator clip to the + terminal and the black alligator clip to the - terminal. This mount operates on 12v DC only.

Auto Guider :

The terminal is used to connect an auto guider to the mount. There are three cables available with the following terminations: RJ-14, ST-4 and ST-7.

Control Box :

This is the connector for the hand control box. Before inserting the cable into the connector make certain that the pins are aligned.

PC :

This terminal is connected to the computer cable supplied the mount that terminates in an RS232 serial connector.

Fig. 2

Fig. 3

Note: Serial to USB connectors are available for computer without serial ports.

【Caution】

* Insert the power connector carefully into the DC 12v receptacle making certain that it bot toms out to supply a firm connection for the power.
* The blank connector is currently not used and is provided for future expansion.

■ Control Box

① R. A. Centering Buttons [red]

When these buttons are pressed the mount moves in R.A. speed up or slow down.

② Dec. Centering Buttons [white]

When these buttons are pressed the mount moves either up or down in Dec.

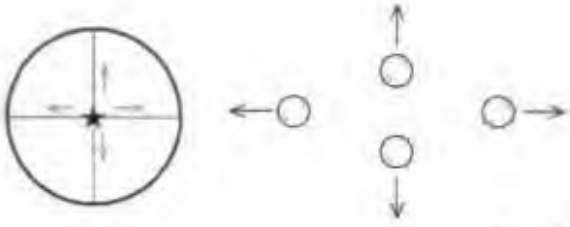


Fig. 4

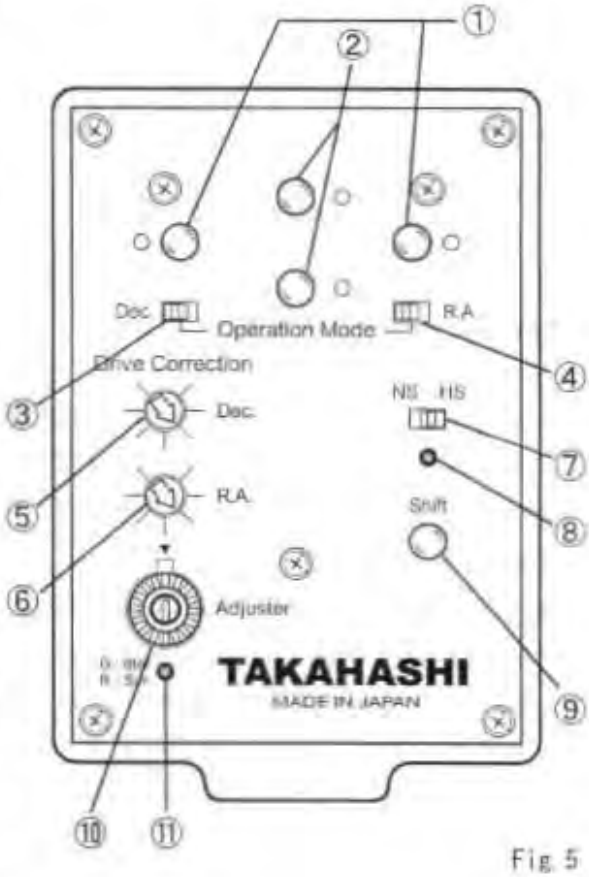


Fig. 5

③ Dec. Mode Operation Switch

This switch is used to reverse the direction in which a star is moved when either Dec. button is pressed. Using this control enables the observer to move the star in the direction that coincides with the position of the button on the hand control either up or down or right or left. This control allows the observer to more easily center an object in the field of view.

④ RA Mode Reversal Switch

As with the Dec switch, this is used to reverse the direction in which a star is moved to match the position of the R.A. button so that when the left button is pressed the star moves to the left in the field, etc.

⑤ Dec Speed Dial

In the Normal Speed Mode this dial adjusts the speed at which a star is centered in the Dec. direction fro 0.15 to 14.85 arc seconds per second when the Dec buttons are pressed in either direction.

⑥ R.A. Speed Dial

In the Normal Speed Mode this dial adjusts the speed at which an object is centered in R.A. from -1% to 99% of the sidereal rate in either direction.

⑦ Drive Mode Switch

This switch is used to change the motor speed range from normal to high speed or vice versa.

HS = High Speed

NS = Normal Speed

⑧ Motor Speed Light

When the motor speed light turn green the drive motors operate at the normal speed ranges for centering or driving and turns red when the motors are set to run in the high speed slew mode 0f 500x sidereal rate.

⑨ Sync Shift Key

This button allows the user to correct any pointing errors when a slew is made. The shift key is pressed and held. Then the user can center the object in the field and release the shift button which will resynchronize the coordinates of the object to the mount. [This works only with the object of the slew.]

⑩ Drive Rate Selector

This dial is used to select the drive rate either sidereal or solar. The 1 position on the dial is the sidereal rate and the 2 position is solar. For the Southern Hemisphere A is sidereal and B is the solar rate. All other settings are inactive.

⑪ Indicator

【Caution】

The cable from the hand control will be locked in position. Avoid pulling on the hand control cable.

Precautions

1. When the tube assembly is to be moved in Dec, loosen the Dec clamp and be careful to keep fingers away form the clamp lever to prevent fingers from being pinched when the clamp is moved. Refer to Fig.6.

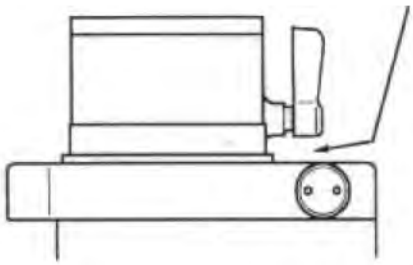
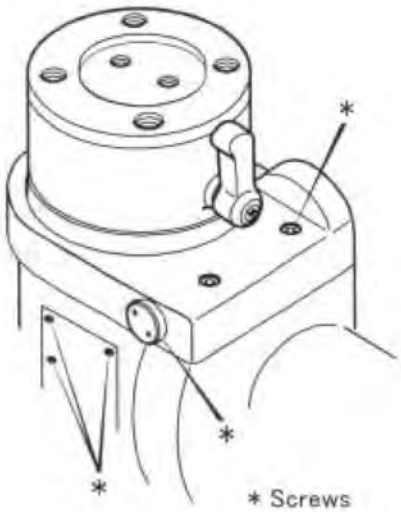


Fig. 6

2. Do not turn or adjust the screws. Doing so will make the mount out of proper function. Refer to Fig.7.

3. A special grease is used to lubricate the mount. The lubrication is meant to last a lifetime. Do not attempt to re-lubricate your mount. Please contact your dealer if service is necessary.

4. Contact you local dealer for factory service to the mount. The mount can be service by factory trained technicians thereby maintain the warrantee.



* Screws

Fig. 7

5. When the polar telescope cover is removed be careful not to insert a finger in the aperture when the Dec shaft is turned to allow the polar telescope to be set up for polar alignment. After the alignment procedure is completed screw the cover back on to the mount to prevent moisture from entering the mount. Refer to Fig.8.

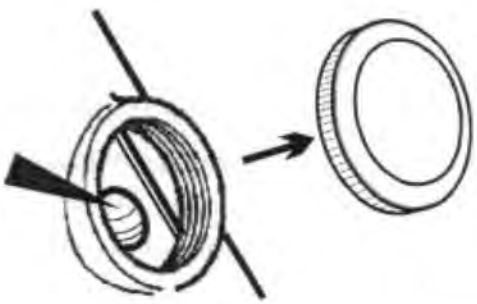


Fig. 8

Assembling the Tripod

■ Tripod

Assemble the tripod as shown in the illustration to the right and insert the bolt into the legs. Be certain that the tripod tray mounting brackets are facing inward. Refer to Fig.9.

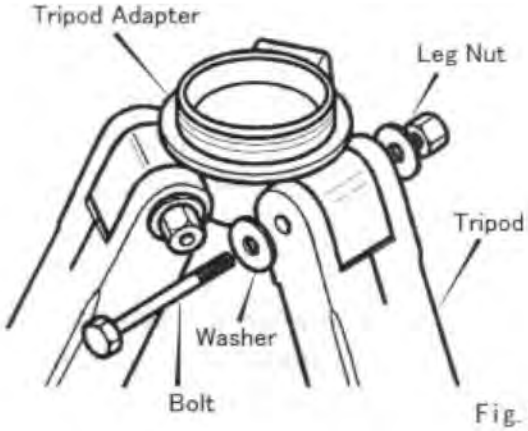


Fig. 9

■ Tripod Tray

Remove the wing nuts to allow the tripod to be spread to its maximum width using the inner set of holes in the metal tripod brackets. Insert the wing nuts from the button but do not tighten them. Then spread the tripod legs as far as they will go and tighten the wing nuts. This will insure the maximum stability for the tripod. Refer to Fig.10.

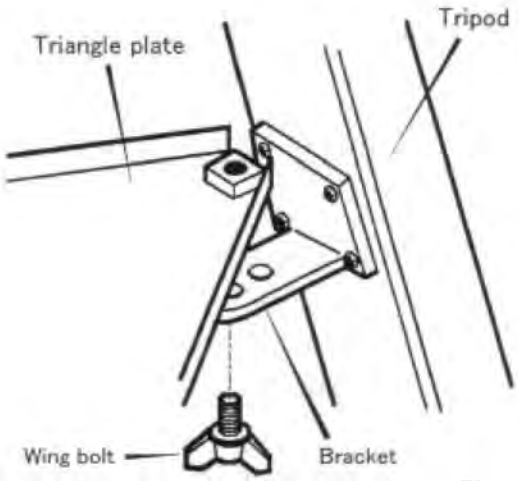


Fig. 10

■ Adjustable Metal Tripod [SR]

This adjustable metal tripod is used as an alternative to the wooden SR tripods to allow the user to vary the set up height of the EM-400. It is easier to leave the mount base attached to the tripod adapter for ease of set up.

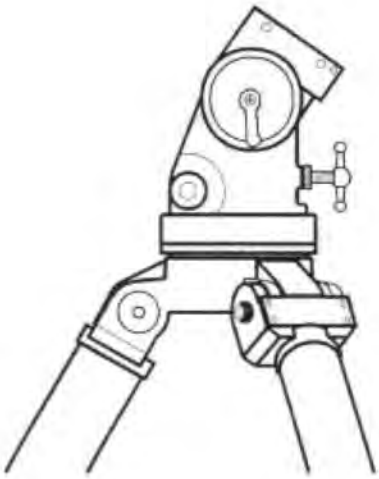


Fig. 11

■ Mount

Set up the tripod so that one of the legs is pointing north. Then place the mount over the flange located at the top of the tripod adapter. Turn the mount until it is pointing north and tighten the set screws with the Allen wrench provided. Refer to Fig.12.

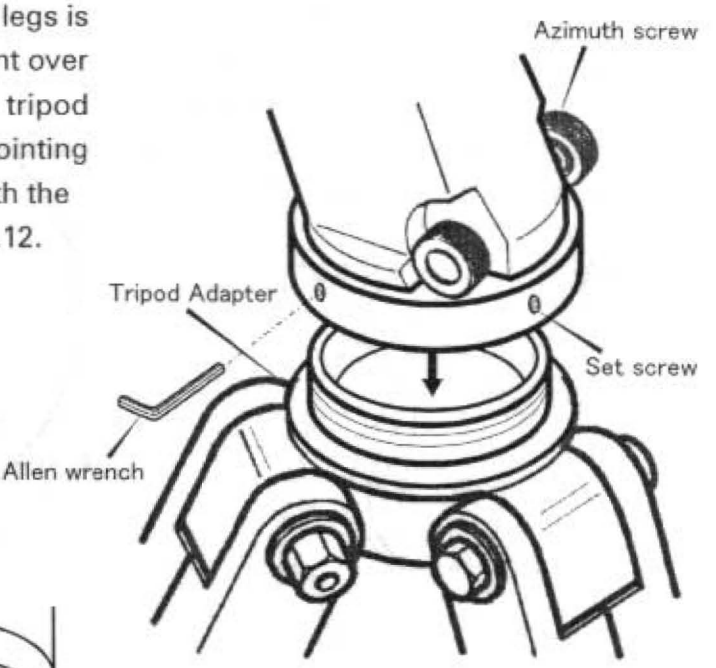


Fig. 12

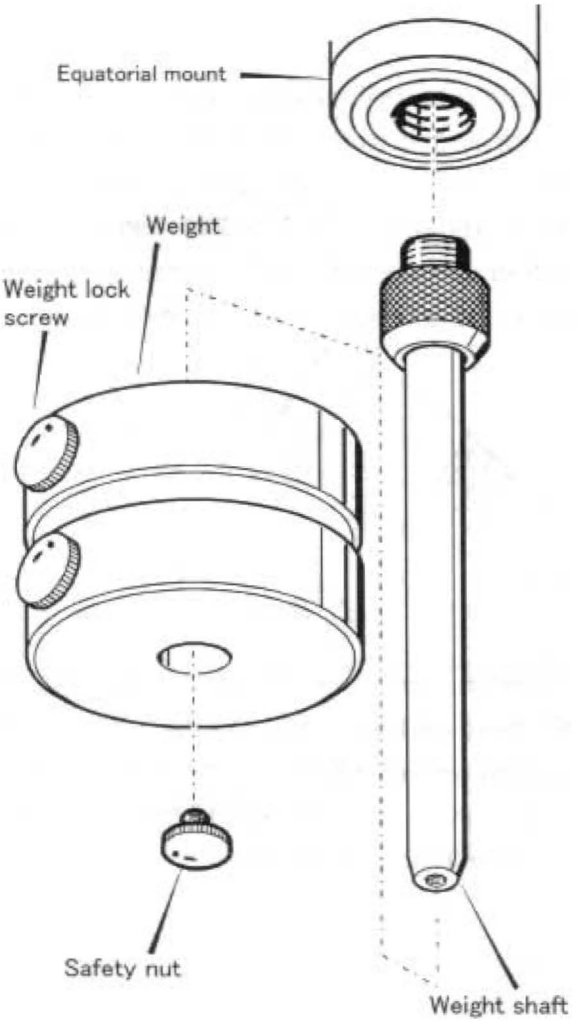


Fig. 13

■ Attaching the Counter Weight and Shaft

Remove the counter weight shaft safety nut and carefully set the counter weights one at a time on to the counter weight shaft and tighten the lock screws. Reattach the safety and continue the balancing procedure. It is best to set the counter weight shaft parallel to the ground to balance the instrument in the RA axis. Refer to the Fig.13.

■ Tube Holder Plate

The tube holder plate has 6 threaded holes in two different patterns which allow any Takahashi tube assembly to be attached directly or with the use of an accessory plate L-type or M-type. Refer to Fig.14.

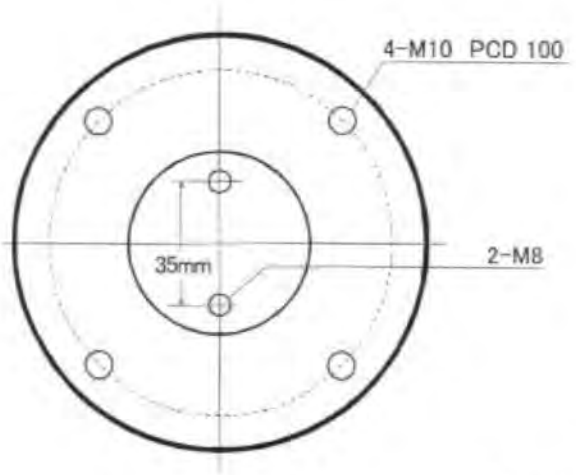


Fig. 14

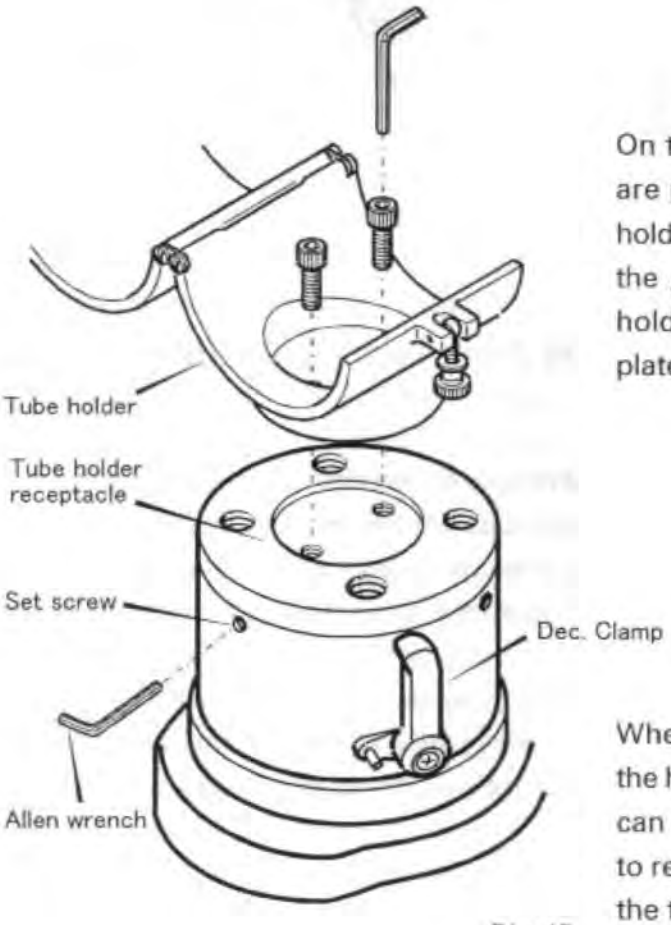


Fig. 15

On the tube holder plate, two 8mm holes are provided to attach any refractor tube holder with two holes in its base. In the event the μ-180 or μ-210 or μ-250, use the tube holder adapter which will raise the saddle plate of the telescope above the base.

When the set screws located in the side of the head are loosened, the tube holder plate can be rotated to any position. Be certain to re-tighten these screws before attaching the tube holder. See Fig.15.

■ Disassembling the Mount

The EM-400 temma2M can be broken down into two main parts:

1. The head assembly contains the electronics and drive gears.
2. The base assembly contains the altitude and azimuth adjusters.

In order to separate the units, loosen the Allen screws located just below the head unit in the base unit. Now the head unit is removed and lifted from the base unit for easy transport or storage. Refer to Fig.16.

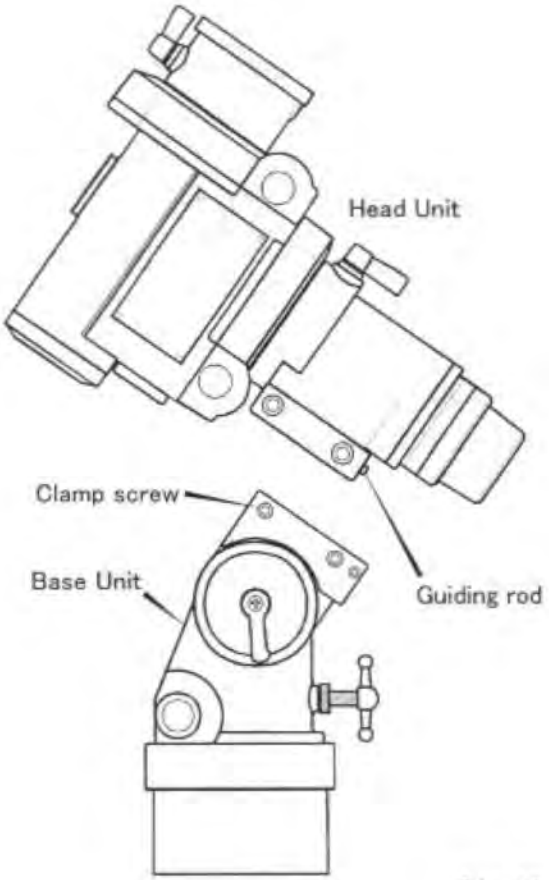


Fig. 16

Fig. 17

⚠ Caution

In order to loosen the clamp screws, never fail to use the Allen wrench provided with the mount. Other wrenches can damage the base unit.

Balancing

After the tube assembly has been set into the tube holder, it is then necessary to balance the telescope and all accessories that will be used.
If imaging will be done, it is a good idea to balance the load over the arc in which the imaging will be performed with all of the imaging equipment attached.

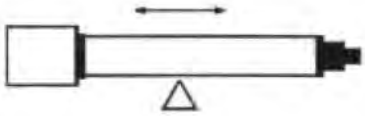


Fig. 18

Now that the instrument has been attached to the mount, it will be necessary to balance the load in the R.A. and the Dec.

The first step is to clamp the R.A. and unclamp the Dec. Hold the tube of the telescope in the event it is out of balance. Then, loosen the tube clamp slightly so that the tube can be moved in either direction. Move the tube in either direction unti it balances. When the tube in balanced, tighten the clamp. Refer to Fig.19.

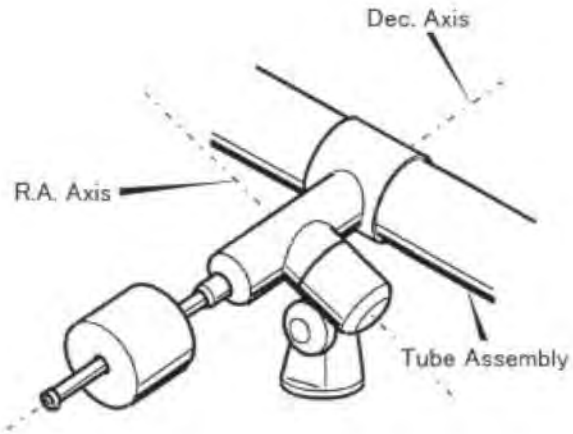


Fig. 19

Next, loosen the R.A. clamp and tighten the Dec. clamp. Unclamp the counter-weight(s) and slide them in either direction until the package is balanced. Refer to Fig.20.

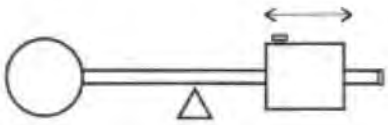


Fig. 20

Functions for the R.A. and the Dec. clamps

The figures to the right illustrate the proper use for the R.A. and Dec. clamps. When the clamps are turned in the direction of the chrome post, the axis is loosened and the mount can be moved manually. When the lever is moved in the opposit direction, the axis will be clamped and the motors will be engaged for positioning the mount. Refer to Fig. 21 and 22.

When you want to place an object in the field of view of the finder, manually move the mount. Unclamp the RA and Dec clamps to allow the mount to be moved manually to the desired location in the sky.

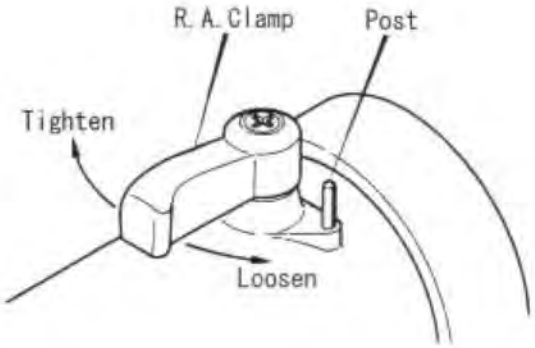


Fig. 21

【Note】
Tightening engages the drives,while loosening allows the axes to be moved manually to any desired position.

Be careful that your finger will be not pinched by the clamp.

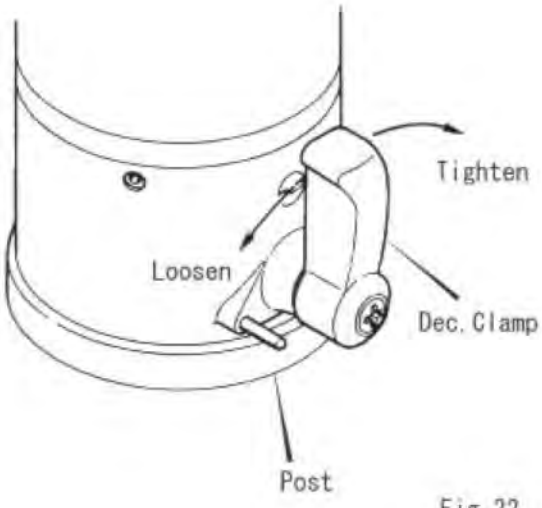


Fig. 22

AZIMUTH AND ALTITUDE ADJUSTMENTS

After the tripod has been properly set up, the mount can now be placed on top of the tripod adapter.

Set the mount on the adjuster so that the azimuth peg is set between the azimuth adjusters. Be certain the azimuth adjusters have been unscrewed to allow the peg to be set in between them. The azimuth adjusters are set into the azimuth housing. See the illustration below. Then, insert the attaching nut into the base of the mount and tighten it until the mount is held in place. Nonetheless, do not tighten the nut too much. Leave it loose enough to permit the mount to pivot as the aximuth screws push against azimuth peg. This is absolutely necessary in order to polar align the EM-400 Temma2M mount. As soon as the mount has been polar aligned, the nut can be tightened up.

The base part of the mount can now be set over the silver flange that is located at the top of the tripod adapter. Turn the base until the azimuth adjusters are over the leg pointing to the north and in the direction as close to Polaris as possible. This can be done by looking through the polar telescope. Since only the mount base is being moved, this is relatively easy.

Once this is done the mount can be set into the slot at the top of the base, the set screws tightened and polar aligned.

Before tightening the set screws it is best to set Polaris in the field of the polar telescope. Then the set screws can be tightened.

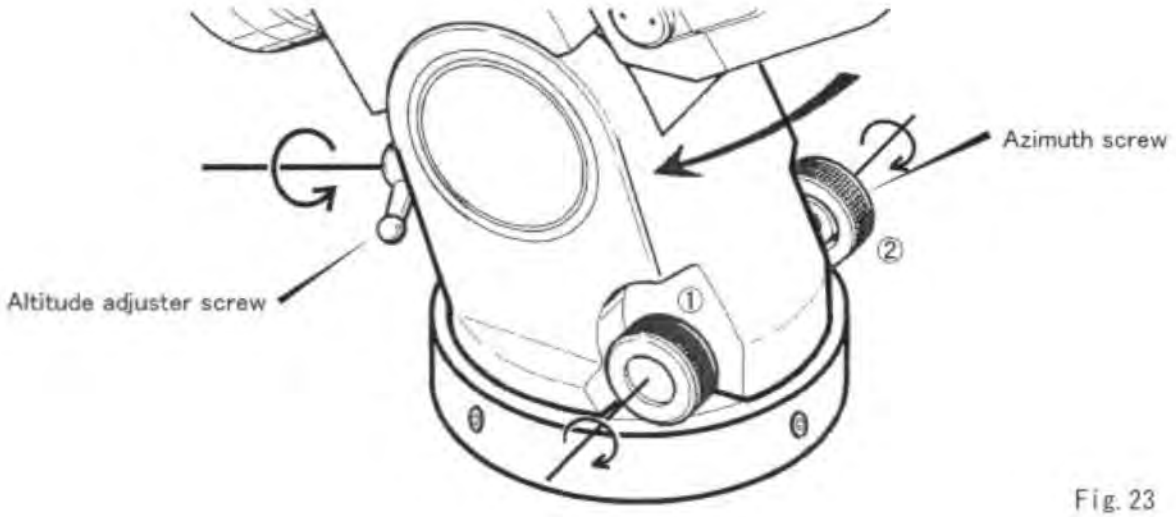


Fig. 23

Polar Alignment in Northern Hemisphere

The EM-400 Temma2M mount is equipped with a highly accurate polar alignment reticle. This reticle permits alignment to within 2 arc minutes of the celestial pole in the Northern hemisphere until the year of 2040 from latitude 0 degree.

The reticle is illustrated below. The outer circle is the date scale and the inner scales the time scale. Towards the center are the scales for the Polaris in the Northern Hemisphere.

Remove the cover from the polar alignment telescope. Unclamp the Dec. clamp and look down the polar telescope from the mount until the hole on the counter-weight shaft permits the objective of the polar telescope to be totally seen, when the position of the Dec. clamp is set just above the Dec. pointer.

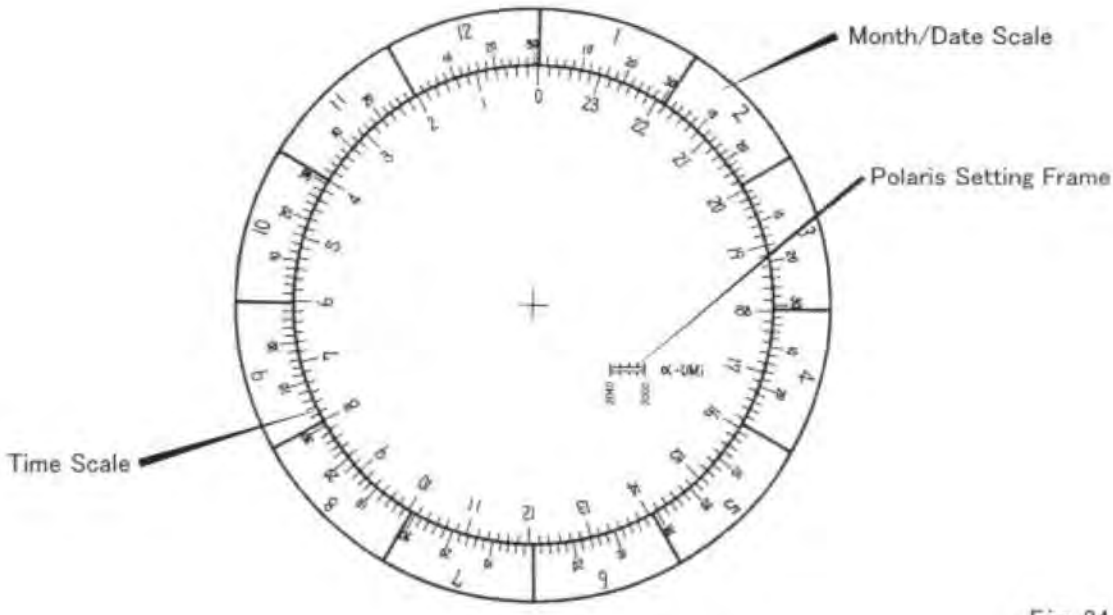


Fig. 24

In order to use the reticle, three factors must be known.

1. The standard time for the observer's time zone
2. The longitude of the observer's location
3. The mid longitude of the observer's time zone

Charts and maps will assist in the determination of the latitude and mid longitude of the observing site's time zone.

The time zone mid longitudes for North America are:

ATLANTIC STANDARD (AST)	60°
EASTERN STANDARD (EST)	75°
CENTRAL STANDARD (CST)	90°
MOUNTAIN STANDARD (MST)	105°
PACIFIC STANDARD (PST)	120°

In other time zone, keep adding or subtracting 15° to approximate the longitude of the obvserving site.

Once the three factors are known, then polar alignment can begin. Turn the Dec. shaft until the hole on the counter-weight shaft is lined up with the polar alignment telescope and turn on the computer stand-by switch located on the control panel. Set the brightness so that the reticle pattern can be barely seen against the stars.

【Note】
Use a plastic screwdriver to carefully turn the brightness adjustment.

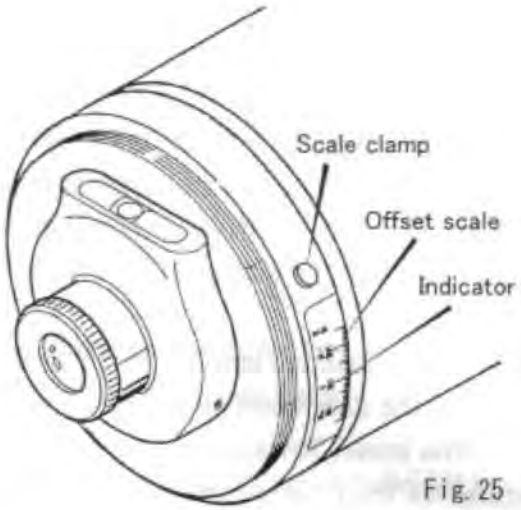


Fig. 25

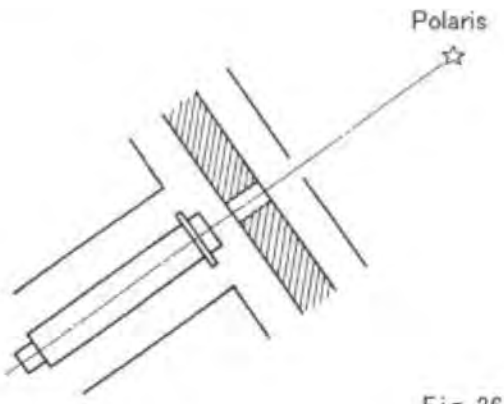


Fig. 26

Fig. 27

Setting the Reticle Offset (1)

As mentioned previously, the EM-400 Temma2M can be set up anywhere in the world due to the design of its reticle. The offset scale located at the rear of the R.A. housing. See the illustration facilitates the precise setting of the reticle for 2 arc minutes polar alignment in the Northern Hemisphere. Study the upper scale, which is the one used for Northern Hemisphere operation. While the lower scale is used for Southern Hemisphere operation.

The offset scale inscribed represents the longitude for observing in Japan. Substitute the appropriate longitude for observing sites in North America.

Use the chart on this page to determine the time zone of the observing site. In order to achieve the highest possible accuracy, the time used must be the standard time for the site. If the observing takes place during daylight saving time, subtract 1 hour from the time to convert back to standard time.

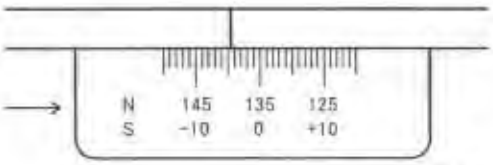


Fig. 28

TIME ZONE	LONGITUDE MARKING(EQUIVALENTS)		
TOKYO,JAPAN (SCALE ON MOUNT)	145°	135°	125°
ATRANTIC STANDARD	50°	60°	70°
EASTERN STANDARD	65°	75°	85°
CENTRAL STANDARD	80°	90°	100°
MOUNTAIN STANDARD	95°	105°	115°
PACIFIC STANDARD	105°	120°	130°

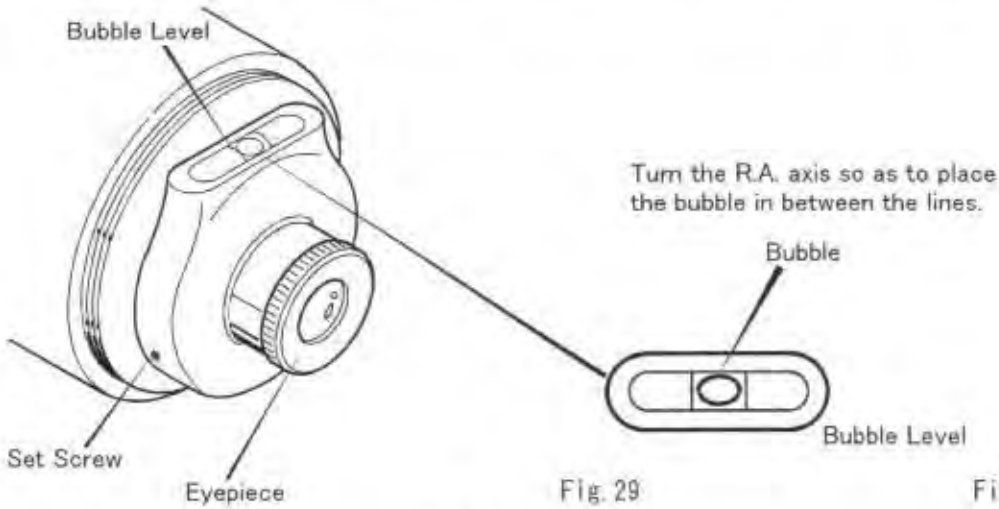


Fig. 29

Fig. 29

The following is an example of setting the offset scale. The city for our example is Houston, Texas at a longitude of approximately 95° west longitude. 5/14 at 8:00PM (20:00),2005.

1. Set the offset scale. (Houston-CENTRAL TIME ZONE) Central longitude of time zone from chart = 90° .
   Longitude of Houston = 95° difference +5°

2. Determine the local standard time for the observing location, (20:00), and note the date (5/14).

3. Turn the R.A. axis until the bubble level is centered between the lines on the level. It is not necessary for the mount to be leveled. In fact, due to the fact that centering the bubble levels the reticle, the mount can be set up on the side of a hill.

4. Turn on the reticle illuminator and set the brightness so that the stars can be seen.

5. Using the altitude and azimuth adjusters on the mount, move the Polaris to the 2005 mark in the reticle, and lock the adjustments. See the illustration below.

The Polaris should be placed between the parallel lines of the reticle in line with the position that is half way between the first two marks which correspond to 2000 and 2010.

Now the EM-400 Temma2M mount has been polar aligned.

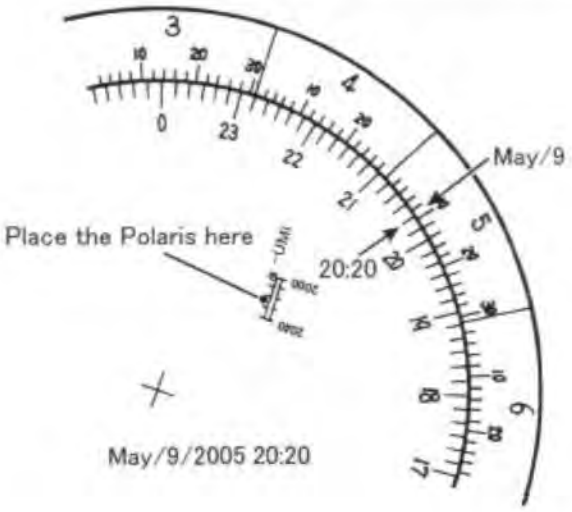


Fig. 31

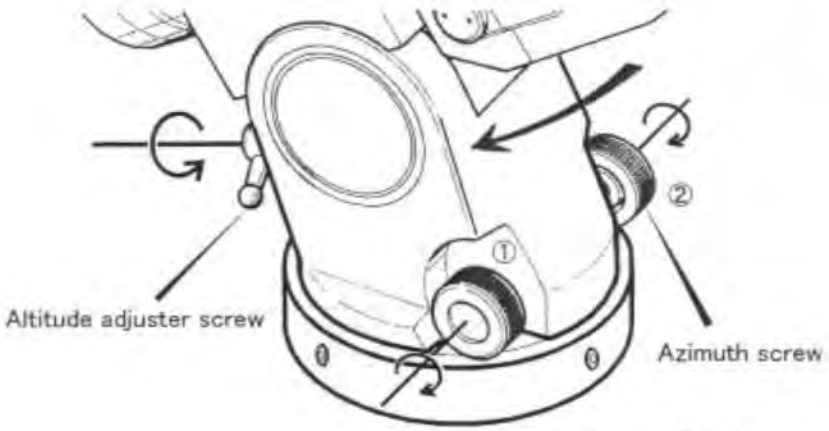


Fig. 30

Setting the Reticle Offset (2)

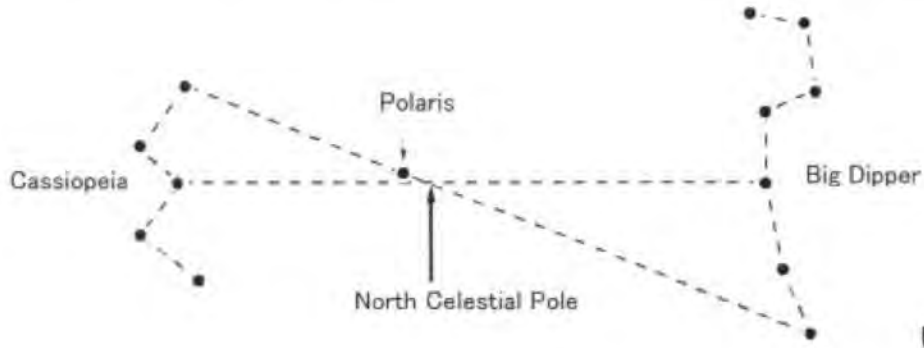


Fig. 32

The polar aligment will be made with the aid of the Polaris. At first, you must find the location of the Polaris in the northern sky. A well- known method to find the Polaris is to use the Big Dipper and the Cassiopeia as illustrated above.

The formation of the Big Dipper and Cassiopeia are to be seen very easily. They are nearly in the opposite position each other with the Polaris being in their center.

Follow the instructions mentioned below.

Cities	LATITUDE	LONGITUDE
Paris	48°50' N	02°20' E
Colmar	48°10' N	07°20' E
Lyon	45°40' N	04°50' E
Marseille	43°20' N	05°20' E
Munchen	48°10' N	11°40' E
Koln	51° N	07° E
Berlin	52°30' N	13°30' E
Hamburg	53°40' N	10° E

1. In order to use the reticle for the polar alignment, you must know of the longitude of your observing site. Charts and maps will help you to determine the latitude and the longitude of your observing site. Listed below are the latitude and the longitude of the major cities in France and Germany.

2. The numbers printed on the offset scale at the line of the "N" represent the longitude east or west. Loosen the clamp screw for the bubble level and adjust the scale so that the indicator shows the longitude of your observing site and tighten the clamp screw. You are recommended to finish the above setting before you go to your observing site.

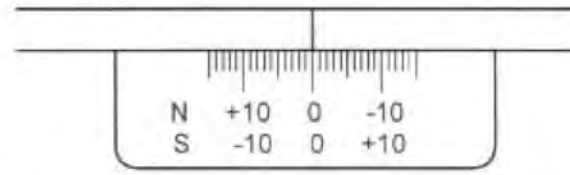


Fig. 33

How to use the mount in lower latitudes

■ Atmospheric Refraction

When the mount is set up below 20° latitude both Polaris and Sigma Octanis will be refracted by the atmosphere. The chart to the left shows the refraction distance the polar alignment stars are form their true position. In latitudes below 20° polar alignment becomes more difficult due the refractive offset of the pole stars.

Using the offset scale to the right will allow for more accurate polar alignment at lower latitudes. The offset distance for Polaris is also listed as a guide.

Place Polaris in top line in the center of scale then using the width of the scale of 1' 09" depress Polaris the approximate distance to offset the refraction. The scale at the top left of the page can be used to determine the offset for Polaris.

10°	0° 5′ 17″
20°	0° 2′ 38″
30°	0° 1′ 40″
40°	0° 1′ 09″

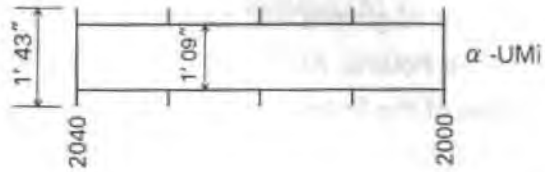


Fig. 34

■ Tripod Adjustment

The altitude range of the EM-400 ML mount is 0 to 47° . When the mount is at a latitude 15° it is necessary to place the counter weight shaft between any of the legs as shown. This will prevent the counter weights from striking the mount when it is depressed to the low latitude. See the Fig. 35.

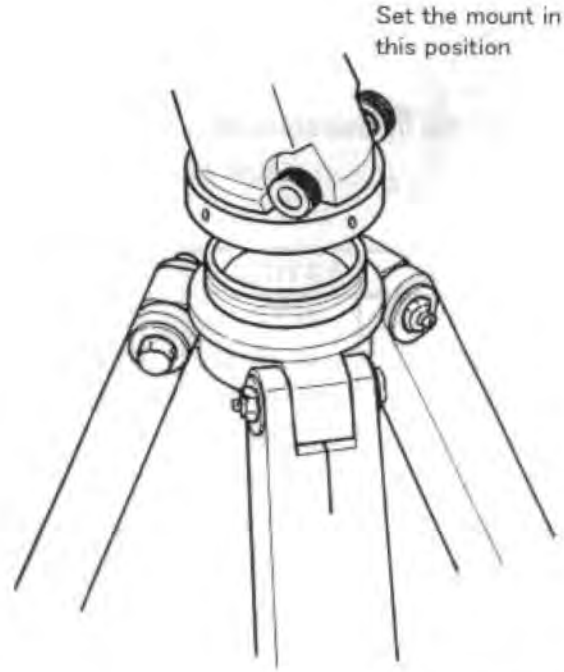


Fig. 35

How to Use the Motor Drive System

The EM-400 T-2M mount is a dual axis mount that is controlled by an attachable hand control that allows any object to be placed in the center of the field of the telescope or for precise centering.
Study the layout of the connectors located on the underside of the Dec. assembly to properly use the mount. Refer to the Fig. 36.

■ Connecting the control box

Carefully insert the control box cable into the control box socket. Note the pin arrangement before carefully inserting the cable into the connector. Fig. 36 illustrates the pin arrangement. It is a good idea to paint the arrow on the plug with white out so that it can be easily seen in the dark.

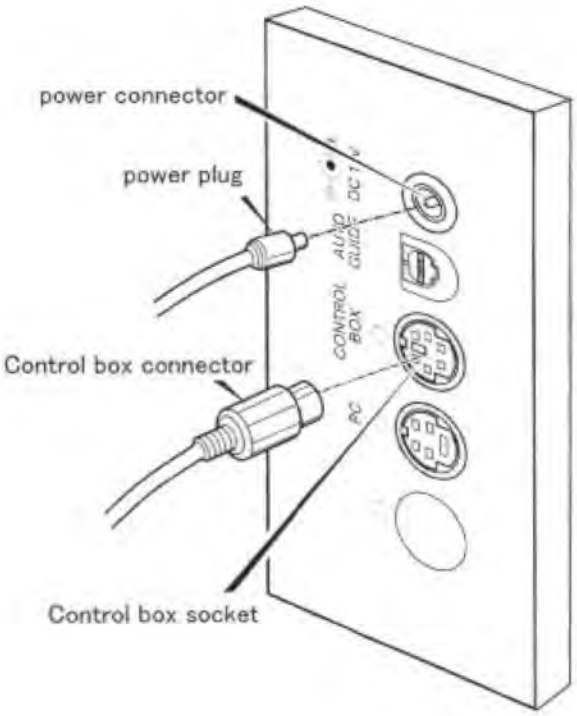


Fig. 36

■ Connecting the 12v DC power source

Be certain that the power switch is in the OFF position before connecting the power source. If alligator clips are used, clip the red clip to the red terminal and the black alligator clip to the black terminal.
Then carefully insert the power plug into the DC 12V plug making certain the plug makes total contact without forcing it.
Finally, after the power cable has been properly connected then the power switch can be turned on.

■ Turning on the power

Connect the control box and power cables to the control panel and power source. Then flip the POWER switch which will start the drive motor and the power light will turn red.

Motor Drive Selection

■ Star/Sun & S/N switching

The Motor Drive Selector Switch set the drive rate for the motor. By turning the selector switch and looking into the window at the top you can choose:

1: Northern Hemisphere sidereal rate
2: Northern Hemisphere solar rate
A: Southern Hemisphere sidereal rate
B: Southern Hemisphere solar rate

[Note] Be careful to set the drive at the desired rate. The mount will only operate on these four settings. Set the rate in daylight.

■ Sidereal Rate

Set the dial at 1 and make sure of connections of the control box and the power cables. When the power swtich is on, the motor starts to run at the sidereal rate in the Northern Hemisphere. Make certain the power indicator is lit. When this mount is used in the Southern Hemisphere, its polar axis is aligned to the South pole. So, set the dial at A to drive the motor at the sidereal rate in the Southern Hemisphere. The dial operation will be necessary to use the mount either in the Northern Hemisphere or in the Southern Hemisphere. Be careful to use it to avoid any possible wrong operation of the motor drive.

■ High Speed Mode

The EM-400 T-2M is designed to include a high speed set motion for both axes. The can be used to move the mount to a desired location without using the "go to" operation or fast motion to move an object to the center of a field of view of the finder or telescope.

Flip the switch to the NS/ HS mode to the HS [High Speed] position. The drive light will change from green NS [Normal Speed] to red for high speed operation. Look into the eyepiece and press the red RA up button and see if the star moves to the right. If it does not, flip the RA mode reversal switch and press the same button. Now the star will move to the right. Repeat the same process with the Dec. up switch and move the Dec Mode Reversal switch so that the star movement moves up when the Dec up button is pressed.

When this has been done hand guiding and slewing of the mount will become easier. [Note: Both the RA and Dec buttons may be pressed at the same time to speed up the slew time.]

※ LED located by each button will be lit when the mount is moving to the direction instructed by the button. The R.A. drive button can instruct speed-up or slow-down to the sidereal rate so one of the LED will be lit because the moving direction of the mount is same, high or low in speed.

■ Centering

Due to errors in polar alignment and atmospheric refractor it may become necessary to re-center an object in the field of view or move the object to another part of the field. This is especially true with cometary motion.

The EM-400 T-2M has been designed to include centering buttons for RA and Dec. The centering speed is set turning the R.A. and Dec. centering speed dials.

1. R.A. Centering Speed

This dial adjusts the R.A. centering speed form 1% to 99% of the sidereal rate in either direction.

Looking into the eyepiece and monitoring the motion will allow the observer to properly adjust the speed to fill the need.

* These rates have no affect on auto guiding rates set by the customer's computer.

2. Dec. Centering Speed

This dial adjusts the Dec. centering speed from .15" arc/sec per second to 14.85" arc/sec per second in either direction. Observing the motion of a star looking through the eyepiece, with the Dec correction button pressed will allow the observer to adjust to the situation.

* Note this centering speed adjust has no affect on the Dec. auto guiding speed set by the customer's computer.

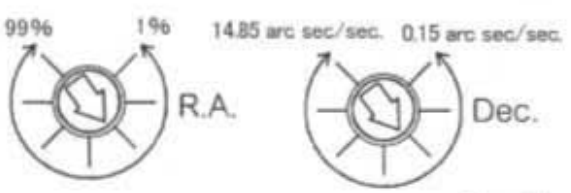


Fig. 37

■ Mode Reversal Switches

During and observing session the observer may note that the motion of a star in the field when the centering buttons are pressed does not coincide with the position of the button on the hand control.

For example, if the Dec. up button is pressed the star moves down in the field and if the RA down [left] button is pressed, the star moves towards the center rather that to the right in the field.

This can be corrected by moving the mode reversal switches on the hand control. Moving the switch of either control reverses the motion of the star in the field.

So, by looking through the ocular and noting the motion of the star when the centering buttons are pressed, the observer can make the motion of the star as it is center match the position of the button on the hand control: so that when the Dec. up button is pressed the star moves up in the field and when the RA down button is pressed the star moves to the left side of the field and the observer has complete control of the centering motion of the star in the field of view.

Note: When the observer presses any of the centering buttons the indicator next to that button will illuminate.

Procedures for Go-To Operation

■ How to do go-to operation by Temma2M

1. Install the Pegasus-21 disc into aPC.

2. Align the go-to mount precisely. When the highly accurate alignment is required, do it as precisely as possible. Go-to accuracy is entirely up to the polar alignment.

3. Connect the go-to mount to a PC with the RS-232C cable provided.

4. First, turn on the go-to mount and then turn a PC switch on. Then, actuate the go-to disc.

5. Now follow the instructions described in the Pegasus-21 manual.

■ Shift button

When the direction buttons are pressed while pressing the Shift button, the encoder signals for the direction given by the direction buttons are cancelled and then the correction drive can be done. This is useful to correct the position of the object brought off the center of the view field by go-to operation, without modifying the coordinate of the object.

* In the R.A. direction, the coordinate of the object can vary due to the backlash of the gearing. In this case, reset the position so that the pointer and the coordinate syncronize each other.

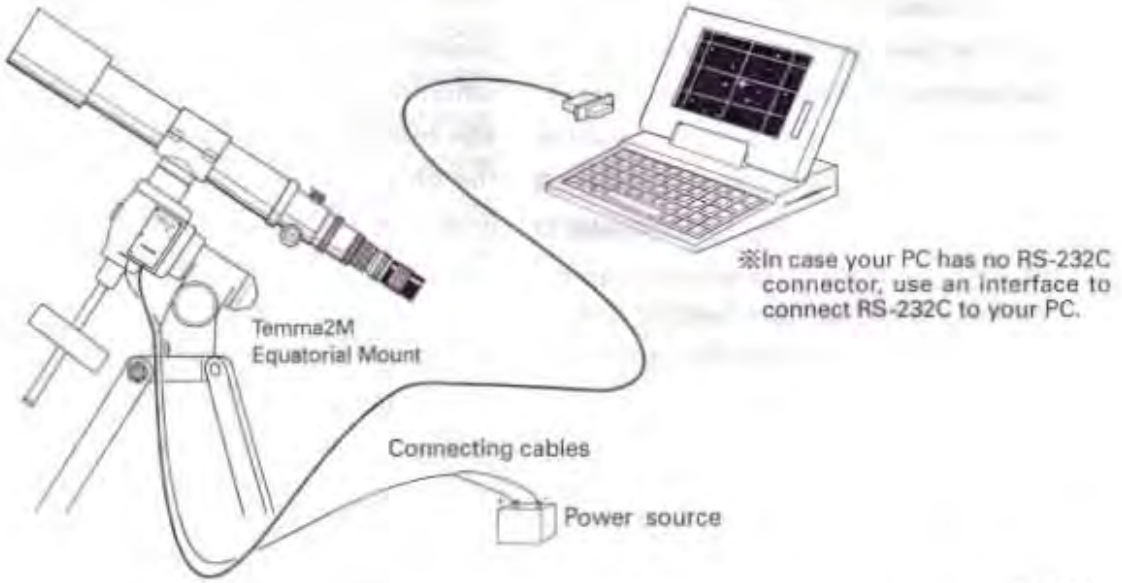


Fig. 38

⚠ Warning

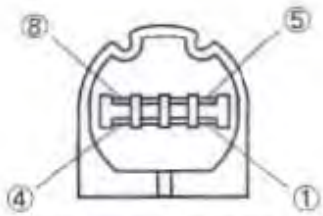
- When an object near the zenith is to be viewed, set the tube assembly and the equipment so that that instrument or any accessory will not hit the mount when the instrument is turned towards the zenith. This can accomplished when the instrument and packing are being balanced. It is then easy to move the instrument to any position and chech to see if everything will clear the mount. Doing so will insure no trouble of "go to" operation of the EM-400 Temma2M mount.

- Be certain, before operation, that go-to can be done safely. You must be always ready for an emergency.

- The go-to mount will give out emission, which may affect medical instruments.

Auto Guide Connection

The EM-400 T-2M is provided with a new style auto guider connector input. The EM-400 T-2M is supplied with the standard RJ-14 connector common to most auto guider cameras.



Terminal arrangement on the mount

Fig. 39

⚠ Warning

Under no circumstances should the mechanical of electrical components be modified by the user. any repair or adjustment must be made by the Takahashi service center to maintain the warranty. Failure to comply with this requirement will void the warrnaty.

■ Auto Guide Connector Chart

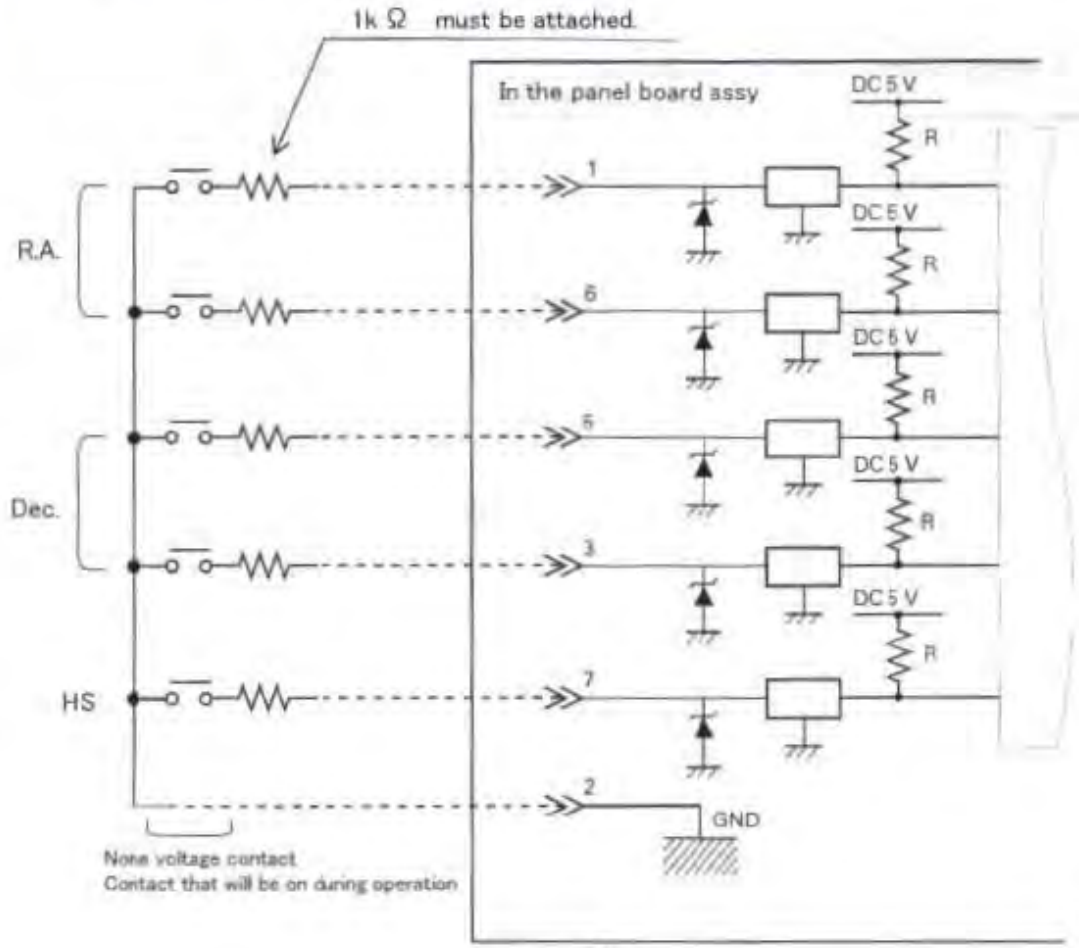


Fig. 40