ΩΞ OMEGA®
User's Guide

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OSAO-Series
Adjustable Output, Ultra Fast Response, Fixed IR Sensors with built-in display

ΩΕ OMEGA®

Index

Chapter - 1

General Information

We are pleased that you have chosen this high quality and highly efficient OSAO-Series pyrometers for non-contact temperature measurement.

Please read this manual carefully, step by step before performing any operation with the Pyrometer. It contains all the necessary instructions for set up and operation of the pyrometer. When operating the instrument, it is necessary to follow the general safety instructions.

1.1 Safety Measures
This section provides an overview about important safety regulations.

1.1.1 General
Each person working with the pyrometer must have read the user manual before operation. The Pyrometer has only to be used for the purpose described in the manual.

1.1.2 Safety Precaution
The Pyrometer works only with a potential-free low voltage of range 24V DC. This voltage is not harmful for the user.

1.1.3 Maintenance and use of Pyrometer
Pyrometer can be operated by the qualified person who has got instructions from the supervisor. It is strongly prohibited to do technical modifications of the device without permission of the manufacturer.

1.1.4 Environmental Protection
The lens or its coating may contain harmful materials and hence it should not be disposed of with normal waste.

1.1.5 Packaging and storage
Always use a shock-proof package for shipment of the pyrometer. It should be sealed to protect it against humidity. Also protect the lens of the pyrometer with a cover. They should be stored at the temperature ranges from 20 °C (68 °F) to +70 °C (158 °F).

Chapter - 2
Introduction

The AO250 model is a highly economic digital IR pyrometer with extended sensor head and separate electronic box for non-contact temperature measurement of metals, ceramics, graphite, etc. in temperature ranges between 250 °C (482 °F) and 1800 °C (3272 °F).

The AO50/50H model is a specially designed digital pyrometer in 4 wire technology with extended optical head which can withstand high ambient temperatures up to 120 °C (248 °F) and 180 °C (356 °F) (AO50H). It has a inbuilt LCD & keypad for parameterization to provide high performance and low maintenance of non-contact temperature measurement for a demanding industrial environment.

2.1 Application, Range and Working Principle
The OSAO-Series pyrometers are especially designed for industrial purposes. The AO250 model is suitable for high temperature measurement ranging from 250 °C (482 °F) to 1800 °C (3272 °F). The AO50/50H pyrometers are suitable for high temperature measurement ranging from 0 °C (-32 °F) to 800 °C (1472 °F).

OSAO-Series IR Pyrometers are two-piece measurement systems containing one extended sensor head and one electronic enclosure. The enclosure comes with built-in 4 digit LCD display and offers many signal processing features. The Keypad on the enclosure helps set the following parameters: Emissivity, Analog Sub range, Relay Setpoint and Hysteresis, Analog Output, Temperature Units, Response Time, Peak Picker and Sensor Address. The sensor head is un-effected by electromagnetic interference. Using the serial interface and provided software temperatures can be displayed and logged to a personal computer. The software can also be used to configure the unit parameters.

The AO250 model has response time of 2 msec adjustable up to 10 seconds. The instrument can be powered directly through the USB without any external power supply.

The pyrometer temperature measurement method utilizes the fact that objects emit thermal radiation in an amount that directly corresponds to their own temperature and surface emissivity.

The pyrometer sensor detects the amount of infrared radiation emitted by the measured object (target). The infrared signal and temperature representation is then analyzed by built-in microprocessor.

The applications for the OSAO-Series:
- Plastic & rubber
- Ceramic
- Paper
- Textile
- Fluids
- Oxide/Painted metal surface
- Wood & glass industries
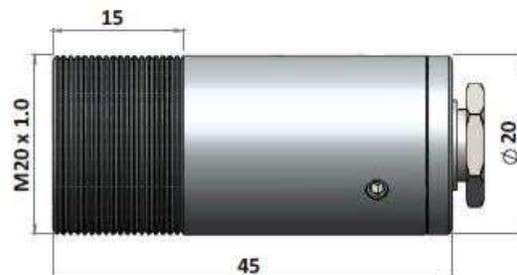
Sensing Head

Chapter - 3
Technical Specifications

Model	OS-AO50-*	OS-AO50H-*	OS-AO250-*
Temperature Range	0°C….800 °C (1472 °F)	0°C….800 °C (1472 °F)	250 °C (482 °F)….1000°C 300°C….1300°C 350°C….1800 °C (3272 °F) (dependent of FOV)
Spectral Response	8…14 µm	8…14 µm	1.6 µm
Photodetector Type	Thermopile	Thermopile	InGaAs
Field of View (FOV)	2:1 or 15:1	2:1 or 15:1	20 : 1, 40 : 1, or 80 : 1
Emissivity (ε)	0.1….1.2 adjustable	0.1….1.2 adjustable	0.1….1.0 adjustable
Response Time	20 msec adjustable up to 10 sec	60 msec adjustable up to 10 sec	2 msec adjustable up to 10 sec
Accuracy	± 1% of the measured value or 3°C whichever value is greater (The sensor head must be at constant ambient temperature for a minimum of 15 minutes)	±1.5% of the measured value or 2°C whichever is greater (The sensor head must be at constant ambient temperature for a minimum of 15 minutes)	**Below 1500°C :** ±0.3% of the measured value +1°C **Above 1500°C :** ±0.4% of the measured value +1°C
Repeatability	0.3% of reading in °C + 1°C	0.3% of reading in °C + 1°C	0.1% of reading in °C +1°C
Temperature Coefficient[2]	± 0.06 °C/°C (± 0.06 °F/°F) or ± 0.06 %/°C (0.06 %/°F) (whichever is greater)	± 0.06 °C/°C (± 0.06 °F/°F) or ± 0.06 %/°C (0.06 %/°F) (whichever is greater)	± 0.055 °C/°C (± 0.055 °F/°F) or ± 0.055 %/°C (0.055 %/°F) (whichever is greater)
Sighting Option	None	None	Laser Pilot Light(PL)
Analog Output	0-20mA, 4-20mA, 0-10V, Thermocouple Type "K" or "J" (User selectable)	0-20mA, 4-20mA, 0-10V, Thermocouple Type "K" or "J" (User selectable)	0-20mA, 4-20mA, 0-10V(User Selectable)
Digital Output	USB 2.0 RS-232/RS-485 interface card (Optional) *At a time only one digital output possible	USB 2.0 RS-232/RS-485 interface card (Optional) *At a time only one digital output possible	USB 2.0 output RS - 232 / RS - 485 interface card (Optional) *at a time only one digital output possible
Operating Temp. Range	Electronic Enclosure up to 70°C Sensor head up to 120 °C (248°F)	Electronic Enclosure up to 70°C Sensor head up to 180 °C (356°F)	Electronic Enclosure and Sensor Head up to 70°C
Storage Temp. Range	-20°C…70°C	-20°C…70°C	-20°C….70°C
Relay Output	Relay Output with hysteresis 60V DC/42V AC RMS,0.4A	Relay Output with hysteresis 60V DC/42V AC RMS,0.4A	Relay output with hysteresis 60V DC / 42V AC RMS, 0.4A
Adjustable Parameters and Features via Software	Emissivity, Response Time, Clear Time (Peak Picker), Analog Output, Sub Range, Unit Of Temperature (°C/°F), Communication mode(Comm.mode), Record feature etc.	Emissivity, Response Time, Clear Time (Peak Picker), Analog Output, Sub Range, Unit Of Temperature (°C/°F), Communication mode(Comm.mode), Record feature etc.	Emissivity, Response Time, Clear Time(Peak Picker), Analog Output, Analog Scale(sub range), Unit of Temperature(°C/°F), Communication mode(Comm. mode), Record Feature etc.
Adjustable Parameters and Features via Keypad	Emissivity, Setpoint, Hysteresis (Hyst), Analog Sub Range, Analog Output, Unit of temperature, Sensor address, Response Time, Clear Time (Peak Picker) etc.	Emissivity, Setpoint, Hysteresis (Hyst), Analog Sub Range, Analog Output, Unit of temperature, Sensor address, Response Time, Clear Time (Peak Picker) etc.	Emissivity, Set Point, Hysteresis (Hyst), Analog Sub Range, Analog Output, Unit of temperature, Sensor address, Response Time, Clear Time (Peak Picker) etc.

Power Supply	12V to 28V DC with reverse polarity protection	12V to 28V DC with reverse polarity protection	24V DC
Power Consumption	Max 2.5 watt	Max 2.5 watt	Max 2.5 watt
Laser Power	Not applicable	Not applicable	<1 m watt
Protection Class	IP65	IP65	IP65
Housing	Sensor head-Stainless Steel; Electronic Enclosure: Zinc	Sensor head-Stainless Steel; Electronic Enclosure: Zinc	Sensor Head : Stainless Steel Electronic Enclosure: Zinc
Isolation	Power supply, *Digital output and Analog output are galvanically isolated against each other * Not applicable for USB 2.0 digital output	Power supply, *Digital output and Analog output are galvanically isolated against each other * Not applicable for USB 2.0 digital output	Power supply, * Digital output and Analog output are galvanically isolated against each other *Not applicable for USB 2.0 digital output
Operating Humidity	10-95%, Non-Condensing Conditions	10-95%, Non-Condensing Conditions	10-95%, Non-Condensing Conditions
Weight & Dimensions	600g 112.5mm x 82.5mm x 33mm (L x W x H)	600g 112.5mm x 82.5mm x 33mm (L x W x H)	600g 112.5mm x 82.5mm x 33mm (L x W x H)

Note:

1 : At ambient temperature 23 ± 5°C, ε=1 and response time = 600msec.

2 : For ambient temperature (sensor head) <18°C and >28°C.

Dimensions

Sensing Head
*all dimensions in mm

Electronics

AO250 Model

Sensing Head

Electronics

AO50/50H Models
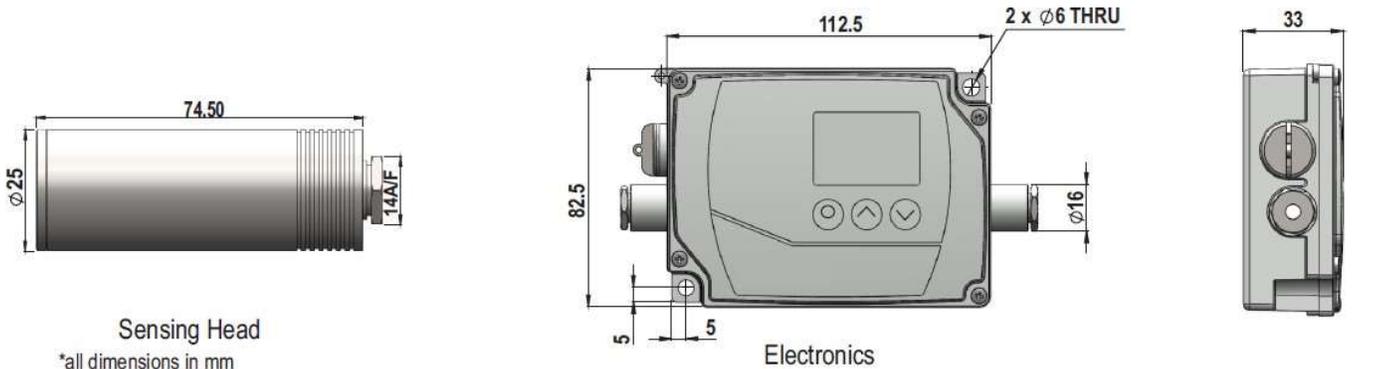
Chapter-4
Setting at the instrument

LCD display for measuring temperature and parameterization

Function key to select different functions

USB output

Sensor cable maximum length 15 mtr.

24V DC input, analog & digital output cable

Function keys for parameter setting

Wall Mounting holes
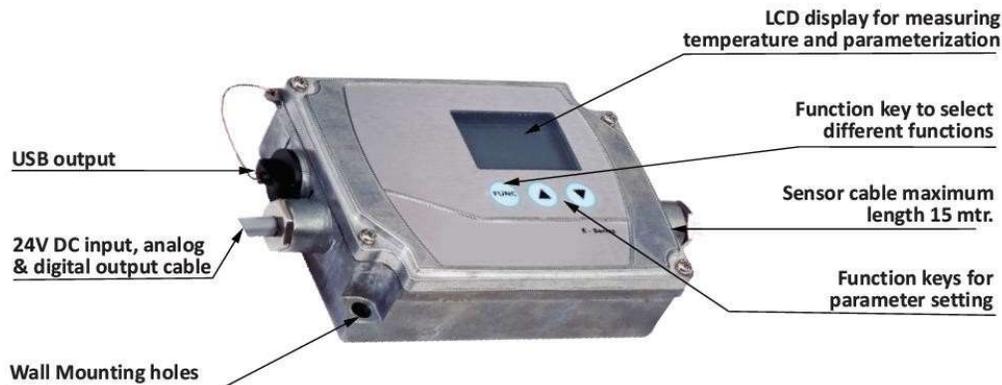
User can power up the unit either by USB input or by using connection cable at 24V DC input. After power up sensor starts an initializing routine for some seconds. After this the object temperature is shown in the display. User must remove the screw (mark USB in figure) to connect the unit with PC via USB cable.
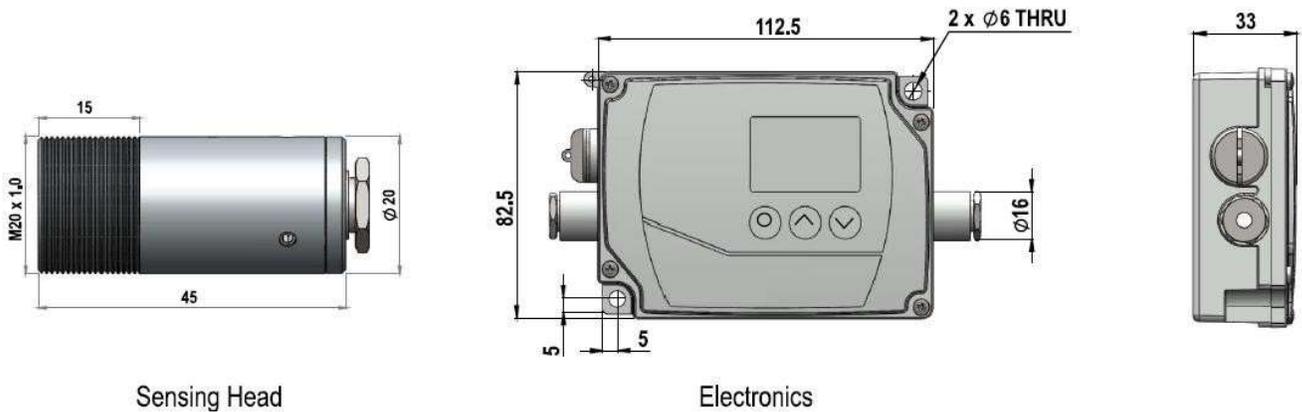
4.1 Operation

The programming keys FUNC, UP and DOWN enable the user to set the device on-site. Normally, LCD shows temperature or error. To view different parameter FUNC key is pressed repeatedly. To change values of parameters UP & DOWN keys are used. After changing values in any parameter by UP & DOWN key finally FUNC key should be pressed to save that value in device. If FUNC key is not pressed after changing parameter value than device will automatically take the old value & device will start showing temperature. If any key is not pressed for more than 5 seconds than device will automatically show the temperature.

For targeting LED light is provided in device **(AO250 Model Only).** Press UP + DOWN key simultaneously to change the present condition of LED (ON / OFF).

4.2 Adjustable parameters

Emissivity: It is the relationship between the emissions of a real object and the emission of a black body radiation source at the same temperature. For a correct measurement it is necessary to adjust emissivity. Emissivity depends on the surface condition of the material, the spectral range of the pyrometer and the measuring temperature. Different material has different emissivity ranging from 0.1 to 1.0. User can change emissivity by given keypad on the instrument.

Set point : Instrument is equipped with a relay contact controlled by the measuring signal. The relay set point is adjusted within the measuring range. The relay contact is "OPEN" below set point value and "CLOSED" above the value.

Hysteresis (Hyst.): The relay contact closes when temperature exceeds the set point. It opens only if the temperature falls below the value which consists of set point and the adjusted hysteresis. It can be adjusted from 2 °C (35.6 °F) to 20 °C (68 °F).

Example: if the set point value is 500°C and Hysteresis is set at 10:
1. Relay contact is OPEN below 500°C
2. Relay contact will CLOSE above 510°C
3. Once CLOSED the relay contact will OPEN again when temperature falls below 490°C.

Ana. Sub range LO: Analog sub-range is adjustable within the basic range, user can set low analog sub-range here.

Ana. sub range HI: User can set the analog sub-range high value here. Minimum span between lower & higher value is 51°C.

Analog output: User can select the output from 4…20mA or 0…20mA or 0…10V and T/C K-type or J-type for AO50/50H Models

Temp. Unit: User can select °C or °F unit.

Sensor address: For communicating with pyrometer via software users have to give an address. The address may be 1 to 255.

Response time: The response time can be set according to specified response range of device.

Picker: Please refer to chapter 7.

Head temp: displays the temperature of head.

Internal temp: displays the internal temperature of pyrometer.

4.3 Connection diagram
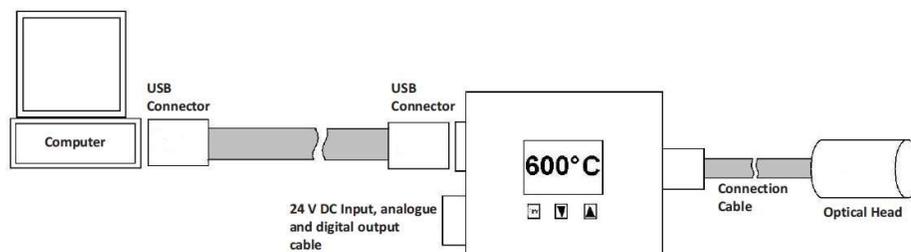
Connection through USB cable

Note:- When the Pyrometer is only powered through USB, the Analog output, LED/Laser and Relay Function not available.

4.4 Pin assignment
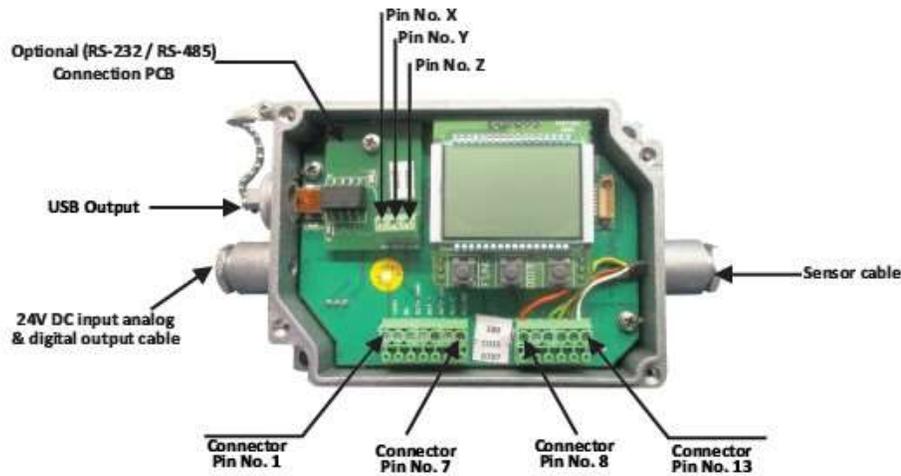
Connector pin assignment:

Pin number	Indication	Descriptions
1	+24 V	DC supply
2	0 V	DC supply GND
3	Out mA(+)	Analog output current (+)
4	Out mA/V/mV (-)	Analog output current/voltage/T/C output (-)
5	Out V/mV (+)	Analog output voltage/T/C output (+)
6	RL1-C	Relay terminal 1
7	RL1-NO	Relay terminal 1

Pin number	Indication	Colour Code
8	O	Orange - Earthing
9	R	Not Connected
10	G	Green
11	Y	Yellow
12	B	Brown
13	W	White

Optional (RS-232 / RS-485) PCB Connection

Pin number	Indication	Descriptions
X	GND	RS-232 / RS-485 GND
Y	Rx/D+	Rx(RS-232) / D+(RS-485)
Z	Tx/D-	Tx(RS-232) / D-(RS-485)

Note:
1. For Analog output, DC supply (+24V DC) is must given to pyrometer first.
2. Pyrometer stabilization time is at least 15 minutes, when ambient temperature is changed.

Chapter-5
Optics

       The pyrometer measures temperature by receiving heat radiation from the object whose temperature must be measured. This heat radiation is passes through the lens to the sensor and is then converted to an electrical signal. The farther the measured object is from the pyrometer, the larger the area that will be measured by the pyrometer. Depending on customer needs, the pyrometer is designed for different FOV. User must select the FOV when ordering.

       Contamination on lens will cause inaccurate temperature reading therefore an air purge unit can be used for sensor head. Cleaning with dry cloth is sufficient for lens cleaning.

5.1 Optical specification (AO50/50H Models)
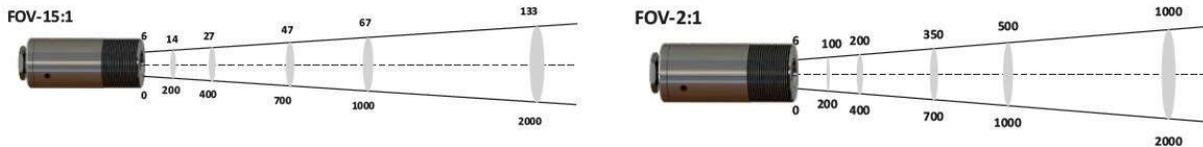
*FOV mentioned on the pyrometer.
For example: If pyrometer FOV is 15:1, then spot size at 1500mm calculated as given below method except that minimum spot should be 6mm.

$$\text{Installed Spot Size} = \frac{\text{Installed Working Distance}}{\text{FOV}} = \frac{1500}{15} = 100mm$$

5.2 Optical specification (AO250 Model)

Working distance (mm)	OS-AO250-*		
	250°-1000°C	300°-1300°C	350°-1800°C
90	4.5	2.25	1.2
300	15	7.5	3.8
600	30	15	7.5
Aperture	5	5	5
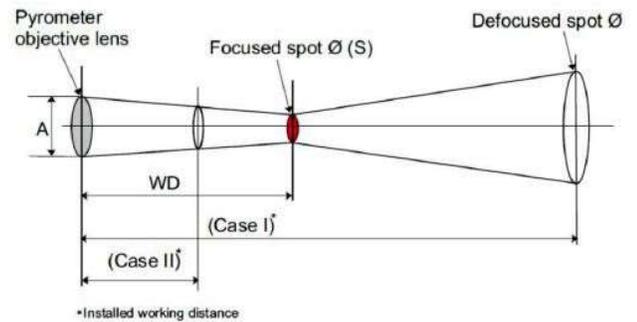
* Manufactured working distance (WD) mentioned on the pyrometer.

If the pyrometer is not installed at manufactured working distance (WD) then spot size at actual installed distance should be calculated. For example, if factory made working distance is 300mm and pyrometer **OS-AO250-201-300** (350°C (662 °F) - 1800 °C (3272 °F)), then spot size is 3.8mm (as given in table). If user installed this pyrometer at 600mm then spot size is not 7.5mm (as given in table), user should calculate using the following:

Case-I: If installed working distance is greater than manufactured working distance

$$\text{Installed Spot size} = \frac{\text{Installed working distance (Case I)}}{\text{WD}} \times (S + A) - A$$

Case-II: If installed working distance is smaller than manufactured working distance

$$\text{Installed Spot size} = \frac{\text{Installed working distance (Case II)}}{\text{WD}} \times (S - A) + A$$

Chapter - 6
Accessories

6.1 Electrical Accessories
6.1.1

**Power supply unit for OSAO-Series
(Reference no: OSAO-PS)**

The input power supply is 110/230V AC check the polarity before connecting the device.

6.1.2

**Converter RS-232 ↔ RS-485 for OSAO-Series
(Reference no: OSAO-Conv)**

The pyrometer can communicate with PC using RS-485 or RS-232. RS-232 is used only for short distances.

RS-485 is well suited for long distance transmission. Standard on PC is RS-232, so a converter is used which converts RS-485 to RS-232.

6.2 Mechanical Accessories
6.2.1
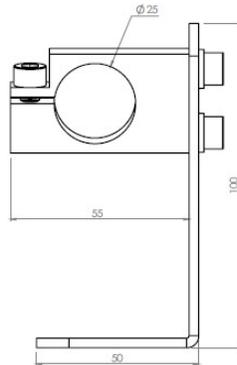
**Adjustable mounting support for AO250 Models
(Reference no: OS-AO250-MT)**

6.2.2
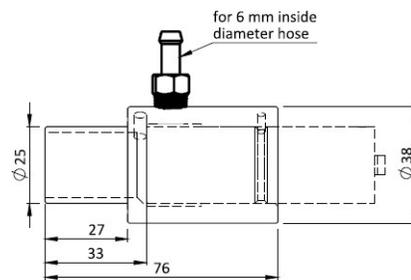
**Air purge unit for sensor head for AO250 Models
(Reference no: OS-AO250-AP)**

6.2.3
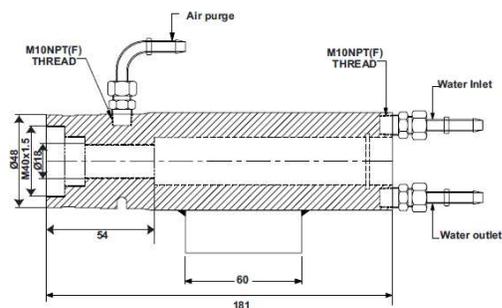
**Water cooling jacket with air purge for AO250 Models
(Reference no: OS-AO250-WCJ-AP)**
Water pressure: < 10 bar
Air pressure: < 0.5 bar
Dry and clean air (oil and dust free)
Air consumption: 2...3 m³/h
Ambient temperature: < 180 °C (356 °F)
Metal: Stainless steel
Weight: 0.45 Kg

6.2.4
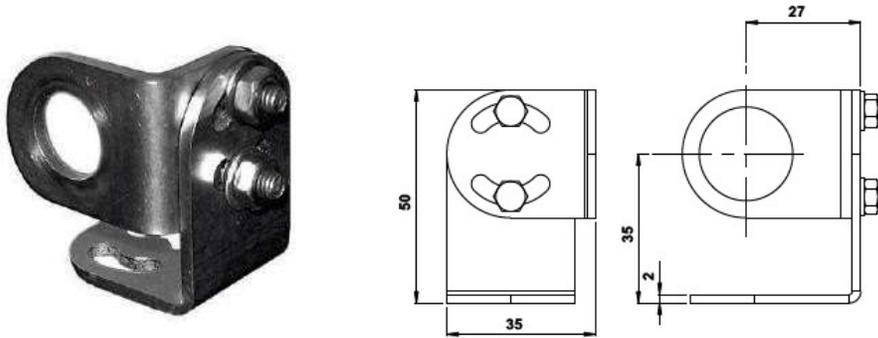
**Adjustable mounting for AO50/50H Models
(Reference no: OS-AO50-MT)**

6.2.5
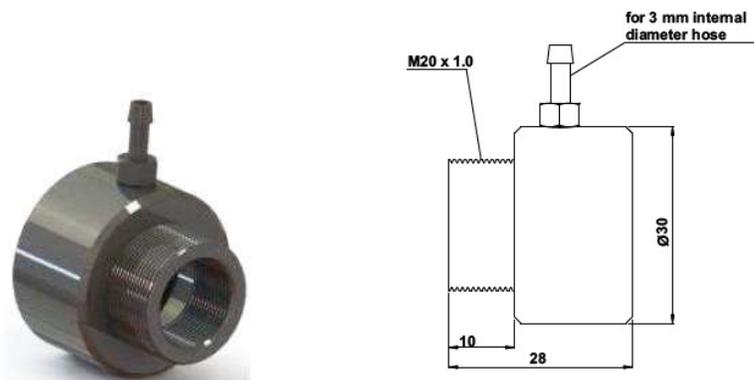
**Air purge unit for AO50/50H Models
(Reference no: OS-AO50-AP)**

Chapter - 7

Software Installation

The provided Omega software "OmegaSoft" offers digital PC interface using USB 2.0. The software has the ability to set all the parameters including response time, analog scale, emissivity, clear time and communication mode.

4.1 Installation

Install the pyrometer software using the installation guide file on CD ROM & restart your PC as per guidelines provided for installation. After installation double click the icon to open the application.
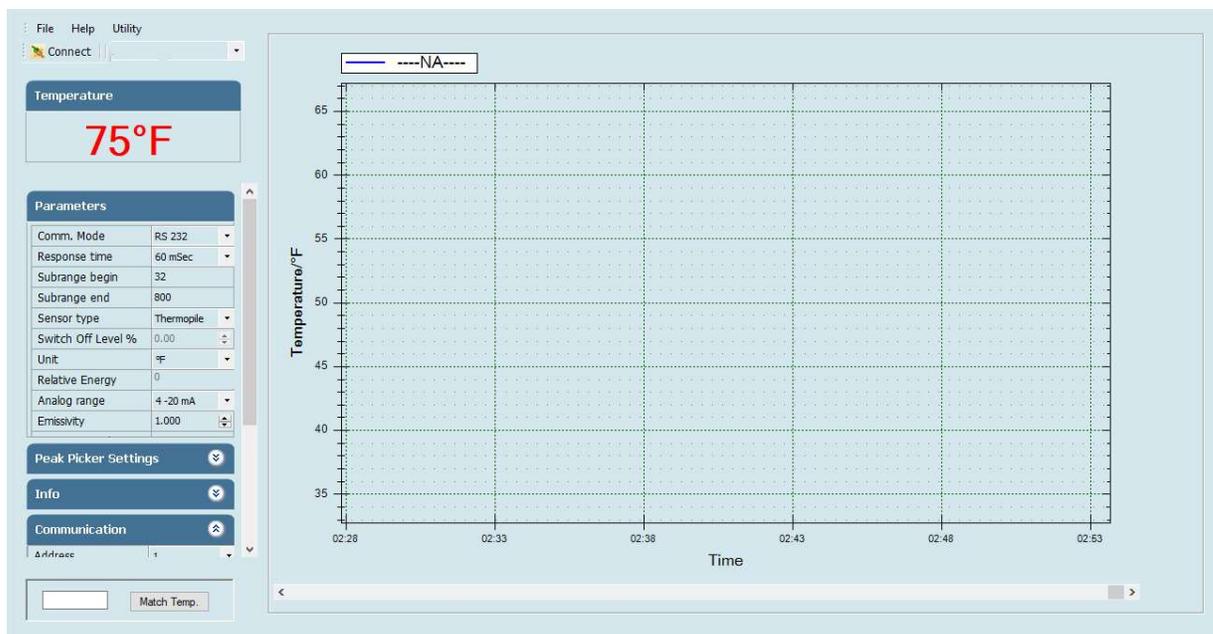
4.2 Parameters in main screen
4.2.1 Communication

Communication between the OSAO-Series pyrometer and the software is implemented via a cable connected between the pyrometer and the PC serial port. This enables the acquisition and recording of data, as well as the transfer of commands from the software application to the pyrometer. Communication can be done by clicking on "Communication panel" then select the correct Com-Port address then select the address of the pyrometer. (Example: Default 01/ printed on the pyrometer sticker). Then click on CONNECT Button.
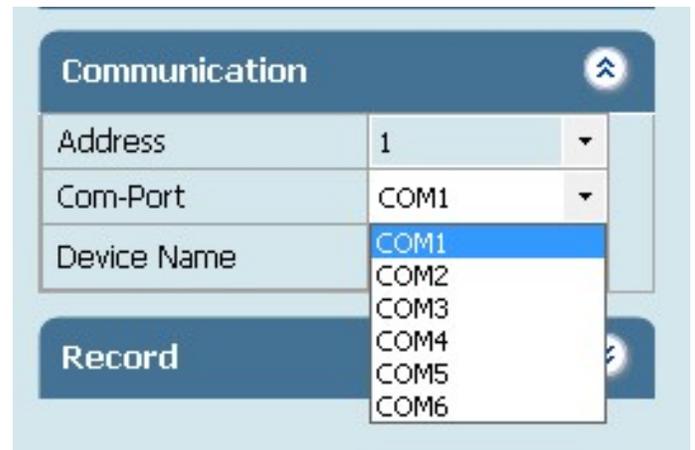
4.2.2 Temperature

It shows the temperature measured by the pyrometer

Temperature

24°C

4.2.3 Parameter Setting

All user selectable device parameters can be set by using the software in the Panel "Parameter"

Temperature

299°C

Parameters	
Comm. Mode	RS 232
Response time	100 mSec
Subrange begin	300
Subrange end	2500
Sensor type	Single Color
Switch Off Level %	0.00
Unit	°C
Relative Energy	0
Analog range	4 -20 mA
Emissivity	0.82
Emissivity Analog	

Info

Communication

Address	1
Com-Port	COM1
Device Name	----NA----
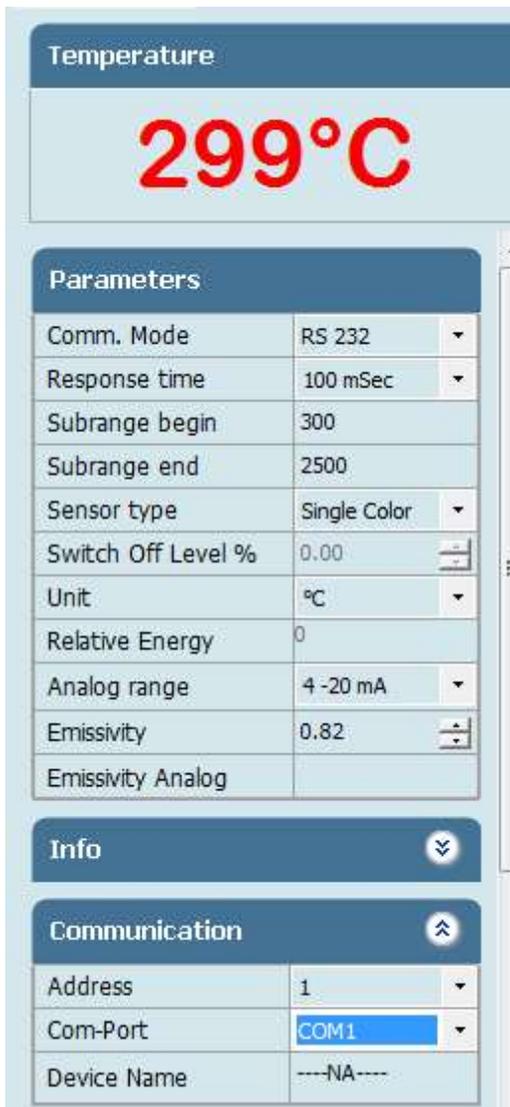
(A) Emissivity settings The emissivity can be set by clicking on "Parameters" and select or type in the desired emissivity directly in the description field. The emissivity value will be transferred to pyrometer by hitting the "TAB " button.

(B) Response time The desired response time can be chosen in the panel Parameter by clicking the appropriate list box (as per the values available in the drop box of response time). This parameter is used to set the analog response time of pyrometer.

(C) Sub Range Begin & Sub Range End User can change the sub range of pyrometer in the panel Parameter. Sub range must be within the basic range of pyrometer, the minimum span between higher & lower range is 51. Analog output will be automatically set according to the sub-range by clicking the "TAB" button.

(D) Sensor Type Shows pyrometer sensor type. User can change sensor type from two color to single color and vice versa (only applicable with two color pyrometer).

(E) Switch off level% (for two color pyrometer) This function is used to avoid measurement errors caused by signals which are too low. Although factory default is set to 15 %, the switch off limit can be adjusted between 2 and 50%.

(F) Unit User can change the measuring unit of temperature from "Centigrade" to "Fahrenheit" and vice versa.

(G) Peak Picker Setting Three Pickers are available in Pickers setting menu (Auto, tCL, Smart). User can switch on any as per requirement, one at a time.

Picker Settings		
Auto	Off	▾
tCL	Off	▾
Smart	Off	▾
Info		
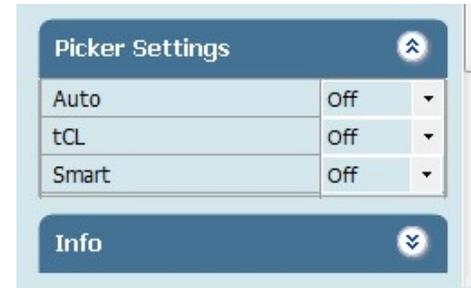
(G1) Auto "Auto" mode is used for discontinuous measuring task, such as object being transported on a conveyer belt in such a case the maximum value for each object has to be indicated. When the object passes the measuring beam of the pyrometer, the maximum value is stored until a new hot object appears in the measuring beam. The temperature which has to be recognized as "hot" is defined by the low limit of the adjusted sub range. The stored maximum value will be deleted when the temperature of the new hot object exceeds the low limit of the sub range by at least 1°C. If a lower limit is not entered, the maximum value storage will be deleted whenever the low level of the full measurement has been exceeded.

(G2) Clear time (tCL) If the peak picker is switched on, the last highest temperature value will always be displayed and stored. As such, it may be beneficial to periodically clear and reset the stored values in order to obtain new temperature readings.

Example: If we set the tCl at "6 sec" the last highest temperature value will be display for 6.0 sec to 12 sec then it will capture next pick.

The following settings are possible:
OFF: With clear time "OFF" the maximum value storage is switched off and only momentary values are measured.

tCL (10msec...25sec): Clear Time tCL can be set between 10msec and 25sec. When set, estimates the maximum value and holds it in buffer memory. After the entered time, the storage will be deleted. Clear Time feature is particularly useful when object temperature is not uniform across its dimension or the pyrometer is not constantly viewing an object to be measured. The peak picker works with two buffer memory locations to find maximum value over a defined interval. With the first memory location, the highest measured value is held and is deleted alternately in the time interval set (clear time). The other memory location retains the maximum value throughout the next time interval. The disadvantages of fluctuations in the display with the clock frequency are thereby eliminated.
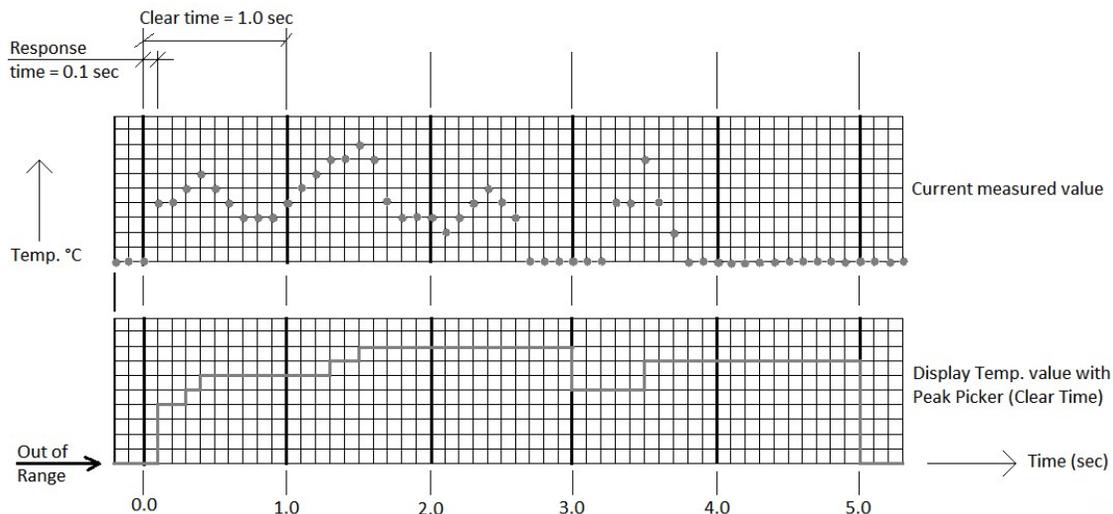
Note:
The maximum value storage coincides with adjustments made to response time. Therefore:
(I) Clear time<= the adjusted response time is useless
(ii) Clear times must be at least 5 times longer than the response time.
(iii) Only maxima with full maximum value can be recorded, which appear at least 5 times longer than response time.

(G3) Smart If the smart picker is switched on, the highest last temperature value will always be displayed and stored. This feature is particularly useful when object temperature is not uniform across its dimension or the pyrometer is not constantly viewing an object to be measured.

Smart Picker Functions
Smart picker can be turned ON & OFF by using the software. When Peak picker is ON, the peak picker menu is enabled for setting of the parameters like decay rate function, reset below temperature and peak picker delay.

Temperature

231°C

Sensor type	Single Color	▼
Switch Off Level %	0.00	▲▼
Unit	°C	▼
Relative Energy	0	
Analog range	4 -20 mA	▼
Emissivity	0.13	▲▼

Picker Settings ⏫

Auto	Off	▼
tCL	Off	▼
Smart	On	▼
Decay Rate (Temp./Sec.)	5	
Delay Time (Sec.)	10	
Reset Below Temp.	200	

Info ⏬

Communication ⏫

(I) Decay rate The Decay rate range is 0.00 to 166.66°C/sec. or 0.00 to 300°F/sec. depending upon °F/°C unit's selection. The slowest Decay rate is 0 degrees per sec. This feature helps to eliminate erratic measurements and allows the peaked value to decay down to lower process temperature values as they occur. Decay rate is set to retain peak measured temperature value and ignore momentary decreases in measured temperature.
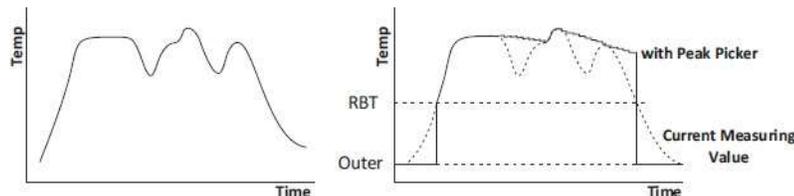
Without RBT   RBT with Decay Rate

(II)Delay Time This function sets the delay time in sec. before peak picker function starts. The delay time is selectable in the range of 0.02 to 10.00 sec. Zero (0) turns delay time OFF. This function is used to delay the start of peaking action for up to 10 sec. following the detection of leading edge of a new target.

Delay Time (sec.)
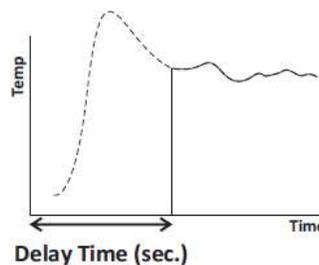
(III) Reset Below Temperature (RBT) The user can set RBT within the limit of pyrometer sub range. This function sets the temperature above which peak picker action starts. When the target temperature matches or is below the selected value, the sensor indicates temperature without picking action.

(H) Relative energy (for two color pyrometer) The relative energy shows a signal weakening which can be caused by contaminations of the optics, viewing window or dust in the field of view. Measuring objects that are too small will also weaken the signal. Relative energy shows the measured intensity compared to the intensity a black body radiation source would have at a determined ratio temperature of the pyrometer.

(I) Analog Range User can select the analog range from the options available.

(J) Comm. Mode User can select the communication mode as per requirement.

Note: To view parameters of multiple devices select the pyrometer name from the drop down list that appears at the top of the screen.

7.2.4 Device information
Pyrometer specific information will be displayed in the Info Panel.
This screen shows the Model, Basic range, Serial number, FW Version, Head temperature, Internal temperature, Working distance and Spot size aperture.

7.2.5 Record
Record is for continuous data logging. It records the measured temperature, emissivity, current date and time. To start data logging click on start button. If user wants to record emissivity, click on record emissivity button.
After Clicking Start button window appears where user can specify the file name and location.

Record will be saved as **.txt** format and the name of file will be user define.
Set minimum record time 1 Sec.

To record emissivity, click on **Record Emissivity** button.

If user wants Spreadsheet format, user can export notepad (.txt file) by choosing Excel Spreadsheet in file menu. To export excel file, "Stop" recording and then select "Excel Worksheet" in file menu so all recorded data of .txt file will be exported to excel file.

File will be stored in *.xls* format named as "export". This "export.xls" file will be saved where the software is installed.

To see previous record, open the file by clicking on menu *File -> open.*
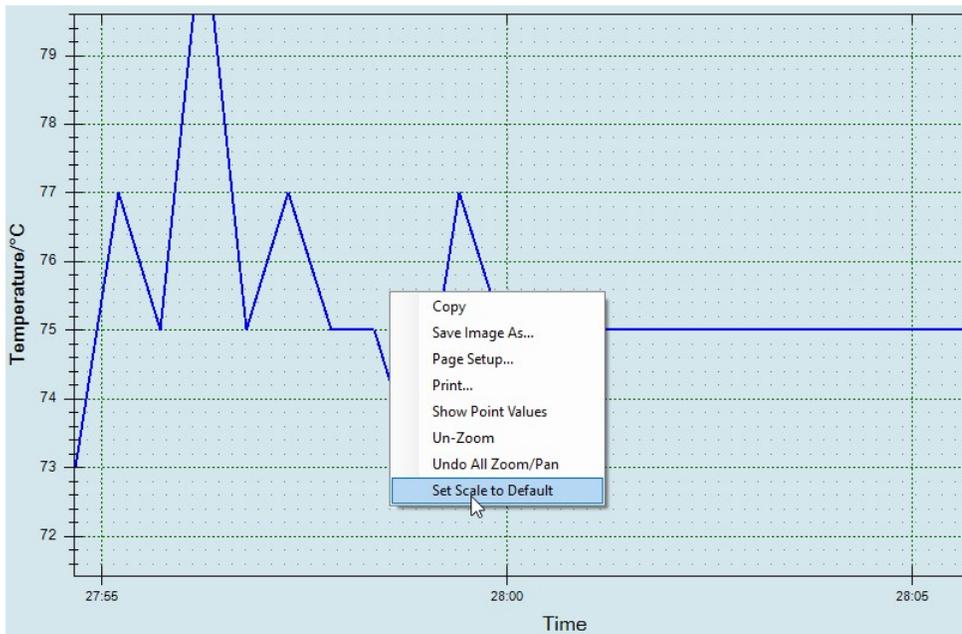Screen containing historical trend & historical data will appear.
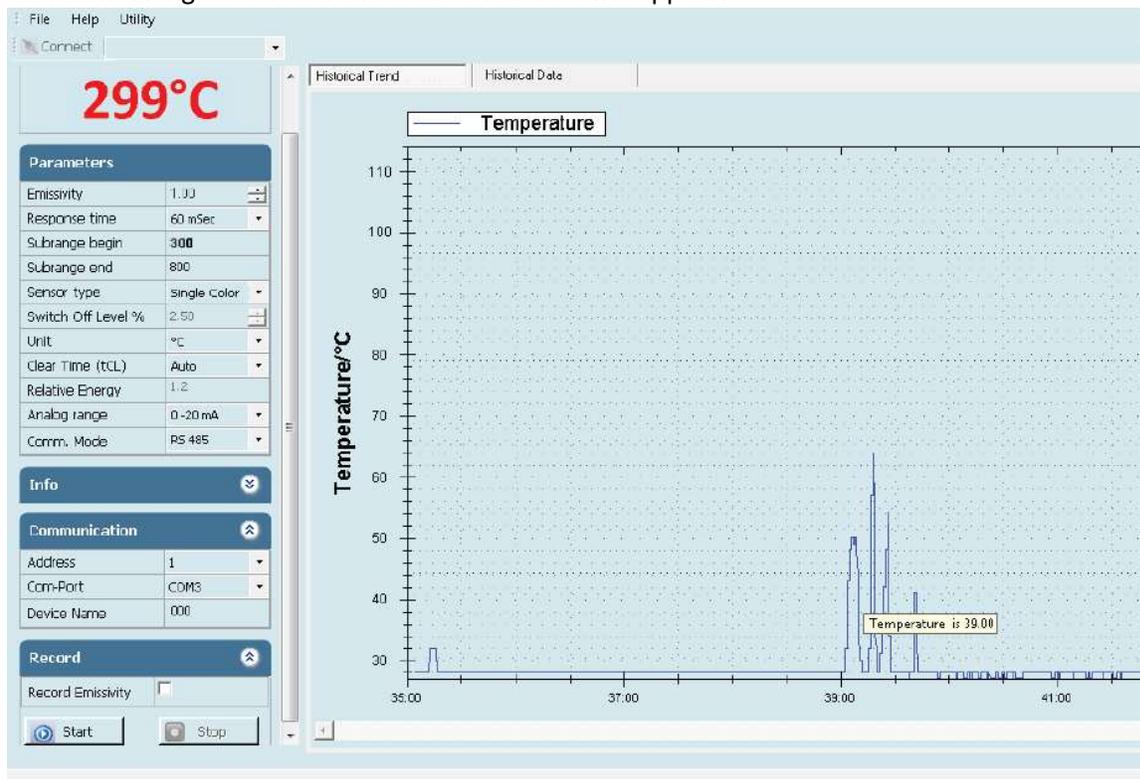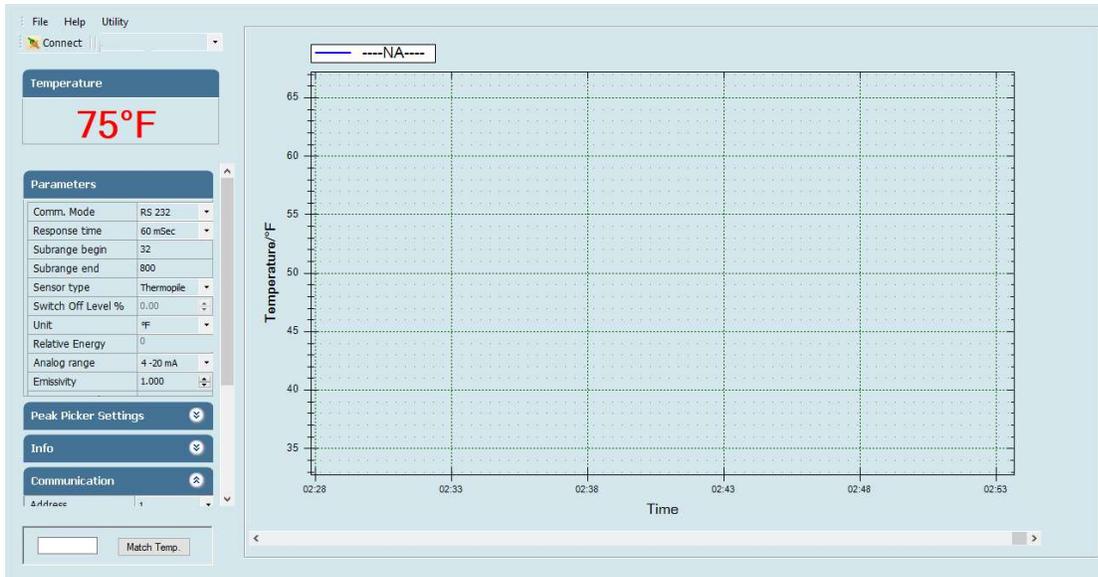
Temperature graph of connected pyrometer is displayed on right side of the screen. This shows the measured temperature corresponding to the time.

Note:
After connecting the pyrometer right click on the graph screen and choose "Set to default" option from pop-up menu.
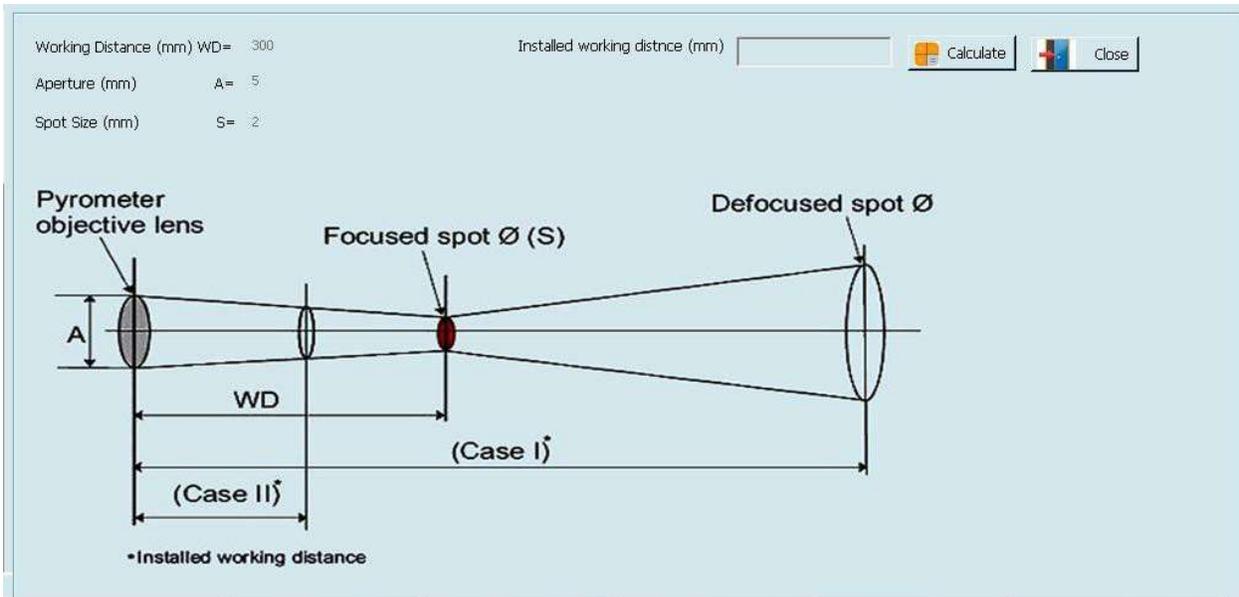
Chapter – 8

Calculate Spot Size

To calculate Spot Size click on ***Utility -> Calculate Spot Size***
This option is used to calculate the spot size at installed working distance of the Pyrometer. When you click on calculate spot size the new window will open.

WD = Manufactured working distance in (mm).
A = It shows the value of lens opening (Aperture in mm)
S = Manufactured spot size of the pyrometer (mm)

User has to enter the value of WD, A, S, of the installed pyrometer (values given in section –2.3).
Entering the value of "Installed working distance" will now show the value of "Installed spot size".

Information

Maintenance

      The pyrometer has no internal parts, which have to be cleaned. The lens can be cleaned with compressed air, which is dry and free of oil. If the protection glass requires more thorough cleaning, use a soft, dry cloth such as that used to clean camera lenses.

Packing instructions

      To transport or store the instrument, please use the original box or a box padded with sufficient shock absorbing material. For storage in humid areas or shipment overseas, the device should be placed in welded foil (ideally along with silicone gel) to protect it from humidity.

WARRANTY/DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **13 months** from date of purchase. OMEGA's WARRANTY adds an additional one (1) month grace period to the normal **one (1) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective, it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components in which wear is not warranted, include but are not limited to contact points, fuses, and triacs.

OMEGA is pleased to offer suggestions on the use of its various products. However, OMEGA neither assumes responsibility for any omissions or errors nor assumes liability for any damages that result from the use of its products in accordance with information provided by OMEGA, either verbal or written. OMEGA warrants only that the parts manufactured by the company will be as specified and free of defects. OMEGA MAKES NO OTHER WARRANTIES OR REPRESENTATIONS OF ANY KIND WHATSOEVER, EXPRESSED OR IMPLIED, EXCEPT THAT OF TITLE, AND ALL IMPLIED WARRANTIES INCLUDING ANY WARRANTY OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. LIMITATION OF LIABILITY: The remedies of purchaser set forth herein are exclusive, and the total liability of OMEGA with respect to this order, whether based on contract, warranty, negligence, indemnification, strict liability or otherwise, shall not exceed the purchase price of the component upon which liability is based. In no event shall OMEGA be liable for consequential, incidental or special damages.

CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY/DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS/INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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