

Rec id 115

25

MTSU Clean Energy Initiative Project Funding Request

There are five (5) sections of the request to complete before submitting. See <http://www.mtsu.edu/~sga/cleanenergy.htm> for funding guidelines.

| 1. General Information | |
|---|-------------------------------|
| Name of Person Submitting Request : Leslie Mayberry | |
| Department/Office : Energy Services | Phone # (Office) 615-904-8356 |
| MTSU Box # 32 | Phone # (Cell) 615-238-7391 |
| E-mail : LMayberr@mtsu.edu | Submittal Date 10-6-2015 |

| 2. Project Categories (Select One) | |
|--|---|
| Select the category that best describes the project. | |
| <input checked="" type="checkbox"/> Energy Conservation/Efficiency | <input type="checkbox"/> Sustainable Design |
| <input type="checkbox"/> Alternative Fuels | <input type="checkbox"/> Other |
| <input type="checkbox"/> Renewable Energy | |

| 3. Project Information |
|---|
| <p>a. Please provide a brief descriptive title for the project.</p> <p>b. The project cost estimate is the expected cost of the project to be considered by the committee for approval, which may differ from the total project cost in the case of matching funding opportunities. Any funding request is a 'not-to-exceed' amount. Any proposed expenditure above the requested amount will require a resubmission.</p> <p>c. List the source of project cost estimates.</p> <p>d. Provide a brief explanation in response to question regarding previous funding.</p> |
| 3a. Project Title : Onicon flow meter and Flir infrared camera equipment (general campus Co-Gen Plant) |
| 3b. Project Cost Estimate : flow meter \$17,260 +\$1726=\$18986 Flir camera \$9,000+900=\$9,900 Total is \$28,886 |
| 3c. Source of Estimate : Onicon Incorporated and Flir |
| 3d. If previous funding from this source was awarded, explain how this request differs? N/A |

4. Project Description

(Completed in as much detail as possible.)

- a. The scope of the work to be accomplished is a detailed description of project activities.
- b. The benefit statement describes the advantages of the project as relates to the selected project category.
- c. The location of the project includes the name of the building, department, and/or specific location of where the project will be conducted on campus.
- d. List any departments you anticipate to be involved. Were any departments consulted in preparation of this request? Who? A listing may be attached to this form when submitted.
- e. Provide specific information on anticipated student involvement or benefit.
- f. Provide information for anticipated future operating and/or maintenance requirements occurring as a result of the proposed project.
- g. Provide any additional comments or information that may be pertinent to approval of the project funding request.

4a. Scope: Work to be accomplished

Onicon flow meter would allow continuous monitoring from co-gen plant of condensate system. Condensate returned to the boiler plant is a high quality source of boiler feed water, containing both chemical treatment and heat energy. If it is not returned to the plant the feed water has to be made up with untreated 40 degrees domestic water. This means additional chemicals used as well as fuel (natural gas) has to be used to bring the feed water up to the lost condensate level. This additional fuel and treatment significantly increases the cost to produce steam for use on campus. This equipment will be used to measure the amount of return condensate water back to the Co-Gen Plant

The Flir t400 series camera. This equipment offers a flexible, efficient and variably universal method of gathering and analyzing equipment data with its high temperature range, multiple hot spot measurement, and WI-FI connectivity. Use this technology as a leak management tool for underground leak detection. Infrared would locate temperature differentials.

4b. Scope: Benefit Statement

Flow meter-With this improved method of measuring water flow MTSU will be able to better address its water loss. This project will save energy, water, and chemical usage. Steam is the primary heating source for the campus. Recovering the condensate saves energy, water, and chemicals. The piping network develops more leaks as it ages. Additional metering will help identify condensate loss and promote more efficient and cost effective repairs.

Steam is the primary heating source for the campus. Recovering the steam condensate saves energy, water, and chemicals. The piping network develops more leaks as it ages. Additional metering will elp identify condensate loss and promote more efficient and cost effective repairs.

Flir camera-We can lose considerable condensate water daily if leaks are not detected and repaired. The condensate lines are located underground, therefore leaks cannot be detected by visual inspection. This equipment will help us to detect leaks by looking at multiple hot spots below the surface using its infrared technology. With this improved method of locating leaks, MTSU will be able to better address leaks and save hundreds of dollars each day. Other saving include energy recovery and chemical waste.

| 4. Project Description (continued) |
|--|
| 4c. Location of Project (Building, etc.) flow meters are for the condensate lines (Co-Gen Plant) and the Flir camera is for the miles of condensate lines located at MTSU. |
| 4d. Participants and Roles Energy services staff |
| 4e. Student participation and/or student benefit n/a |
| 4f. Future Operating and/or Maintenance Requirements. none |
| 4g. Additional Comments or Information Pertinent to the Proposed Project. n/a |

5. Project Performance Information

Provide information if applicable.

- a. Provide information on estimated annual energy savings stated in units such as kW, kWh, Btu, gallons, etc.
- b. Provide information on estimated annual energy cost savings in monetary terms.
- c. Provide information on any annual operating or other cost savings in monetary terms. Be specific.
- d. Provide information about any matching or supplementary funding opportunities that are available. Identify all sources and explain.

5a. Estimated Annual Energy Savings (Estimated in kW, kWh, Btu, etc.) see below

5b. Annual Energy COST Savings (\$) Condensate loss can be significant. This equipment will help monitor our water usage and assist in identifying the location of leaks, etc. for more efficient and cost effective repairs. This will result in water savings (\$3.65 per thousand gallons), energy savings, and chemical savings.

5c. Annual Operating or Other Cost Savings. Specify. (\$) Anticipated annual savings for repairs are \$4000 to \$10,000 (depending on amount of condensate recovered).

5d. Matching or Supplementary Funding (Identify and Explain) N/A



Made in the USA

**• F-4200 SERIES •
CLAMP-ON ULTRASONIC
FLOW METER**



ONICON F-4000 Series Ultrasonic Flow Meters utilize the differential transit time method to measure the velocity of relatively clean liquids in full pipes. By measuring the difference between transit times of ultrasonic sound waves travelling between two transducers, the flow velocity and direction are accurately determined.

DESCRIPTION

ONICON F-4200 Clamp-on Ultrasonic Flow Meters offer an ideal solution for liquid measurement in existing systems when it is impractical to install traditional inline or insertion style flow meters. The innovative design incorporates matched precision clamp-on transducers and signal processing circuitry to accurately measure the flow of most liquids over a wide velocity range. Each F-4200 is provided with transducers and easy-to-use mounting hardware, factory supplied transducer cabling and a wall mount enclosure with an LCD and user interface keypad.

Output signals include a 4-20 mA analog signal, a scaled pulse for totalization, and a relay output for indication of flow direction or alarm status. The F-4200 is also provided with an isolated RS485 output capable of communicating over BACnet MS/TP or Modbus RTU networks. Optional BTU measurement systems are also available.

GENERAL SPECIFICATIONS

ACCURACY

- ± 1.0% of reading from 1 to 40 ft/sec
- ± 0.01 ft/s for velocities below 1 ft/sec

OVERALL FLOW RANGE

0.1 to 40 ft/sec

SENSING METHOD

Clamp-on ultrasonic, differential transit time method in direct or reflect mode

PIPE SIZE RANGE

½" through 48" nominal diameter

POWER SUPPLY OPTIONS

- Standard: 11.5 to 28.5 VDC, 10 Watts maximum
- Optional: 90-240 VAC 50/60 Hz, 15 VA maximum

FLUID TEMPERATURE RANGE

- Standard: -40° F to 250° F
- Optional: High Temperature -40° F to 446° F

APPLICATIONS

- Chilled water, hot water, condenser water & water/glycol solutions for HVAC
- Steam condensate
- Domestic/municipal water
- Process water & other clean liquids

FEATURES

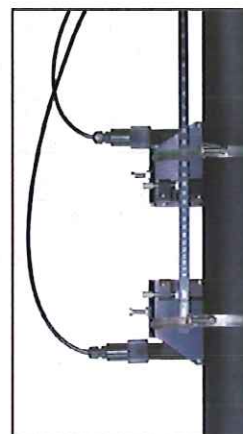
Ideal Solution for Retrofits & Baseline Monitoring - Clamp-on transducers allow for quick installation with no shutdown, no drilling and no pressure drop. Each meter is provided with a built-in one megabyte data logger making it an ideal solution for baseline monitoring.

Simple to Install and Commission - Every ONICON F-4200 is individually configured and programmed using customer specific application data. Complex field programming is not required.

Proprietary Sensing Design Provides High Confidence and Reliability - ONICON provides transducers that are optimized for specific pipe & process conditions. The transducer frequency is automatically matched to the resonant frequency of the pipe at start-up, providing a strong, stable signal with an outstanding signal-to-noise ratio.

Highly Accurate Over a Wide Flow Range - High precision matched transducers combined with our proprietary resonant frequency tuning process provides a strong, stable signal for optimal performance. The integral auto-zero function provides the basis for zero precision and high accuracy, even at very low flow velocities.

Built-in BACnet MS/TP or Modbus Communications - The F-4200 is provided with a single RS485 output that can be configured to operate on BACnet MS/TP or Modbus RTU networks.



Typical Installation on Steel Pipe

11451 Belcher Road South, Largo, FL 33773 • USA • Tel +1 (727) 447-6140 • Fax (727)442-5699

GENERAL SPECIFICATIONS (cont.)



AMBIENT TEMPERATURE RANGE

14° F to 122° F

STORAGE TEMPERATURE RANGE

-4° F to 140° F

OUTPUT SIGNALS PROVIDED

Analog output: Isolated 4-20 mA
(Externally powered 10 – 30 VDC)

Scalable pulse output:

Optically isolated open collector
Contact rating: 30 VDC, 10 mA maximum,
Pulse duration: 50 ms

Relay output for flow direction or alarm:

Programmable form C relay
Contact rating: 30 VDC, 250 mA maximum
RS485: BACnet MS/TP or Modbus RTU

ELECTRONICS ENCLOSURE

Wall mount, NEMA 4 steel enclosure

DISPLAY

Alphanumeric 2-line, 16 character per line
multifunction LCD display (Character height, 0.2")

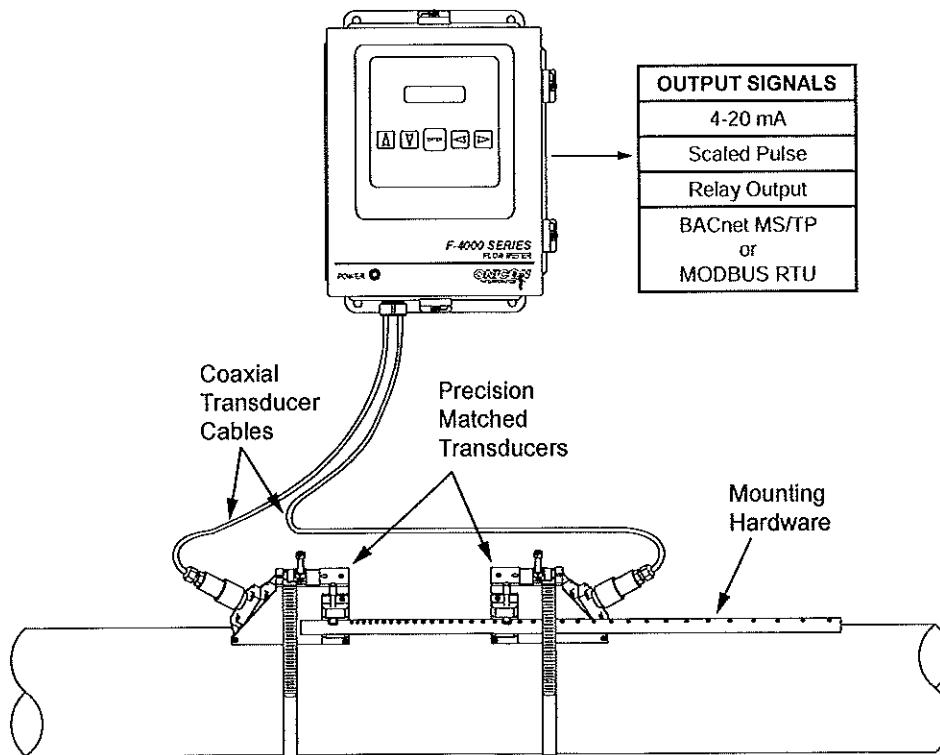
ELECTRICAL CONNECTIONS

Enclosed terminal blocks, cable access through
four standard 3/4" conduit openings

| OPERATING RANGE | |
|--------------------|---|
| Pipe Size (Inches) | Flow Rate (GPM) (0.1 ft/sec - 40 ft/sec) |
| 1 | 0.3 - 108 |
| 1½ | 0.6 - 255 |
| 2 | 1.0 - 420 |
| 2½ | 1.5 - 600 |
| 3 | 2.3 - 920 |
| 4 | 4.0 - 1,560 |
| 5 | 6.2 - 2,500 |
| 6 | 9.0 - 3,600 |
| 8 | 16 - 6,240 |
| 10 | 25 - 9,840 |
| 12 | 35 - 14,100 |
| 14 | 43 - 17,200 |
| 16 | 57 - 22,800 |
| 18 | 73 - 29,200 |
| 20 | 91 - 36,300 |
| 24 | 132 - 53,000 |
| 30 | 210 - 83,900 |
| 36 | 304 - 122,000 |
| 40 | 378 - 151,000 |
| 42 | 417 - 167,000 |
| 48 | 547 - 218,800 |

NOTE: Specifications are subject to change without notice.

TYPICAL INSTALLATION



FLIR-Direct (/)

Search Go

FLIR T420 Infrared Camera

T420



Downloads:

[Datasheet \(/Pdfs/Cache/Www.flir-Direct.com/Flir_Systems/Thermal_Imager/T420/Datasheet/Flir_Systems_T420_Thermal_Imager_Datasheet.pdf\)](#)

[Manual \(/Pdfs/Cache/Www.flir-Direct.com/Flir_Systems/Thermal_Imager/T420/Manual/Flir_Systems_T420_Thermal_Imager_Manual.pdf\)](#)


FLIR T420 infrared camera for industrial/commercial applications. Features a 320 x 240 60Hz infrared detector, UltraMax, WiFi, 0.04°C thermal sensitivity, and a -20 to 650°C (-4 to 1202°F) temperature measurement range.

| | |
|--------------|--------------------------------|
| Your Price | \$8750.00 USD |
| Availability | 1 Week |
| Quantity | <input type="text" value="1"/> |



<http://messenger.providesupport.com/messenger/1e37kpwidthfwx1sgebtny9cydx.html>

Add In House NIST Traceable Calibration to your T420

Add a Calibration Certification CERTIIR4 for \$355.00 

[Clear selected options](#)

ADD TO CART

Description

Specifications

Included

Videos

Resources

Accessories

FLIR T420 Offers

fa

The FLIR T400 series offers a flexible, efficient and variably universal method of gathering and analyzing equipment data with it's high temperature range, multiple hot spot measurements, Wi-Fi connectivity.

Features

- 320 x 240 infrared resolution gives a sharp thermal image for solid accuracy from longer distances
- Thermal sensitivity of <0.045°C helps to find any off putting heat sources faster and easier
- Optimized to measure temperatures ranging from -4°F to 1202°F (-20°C to 650°C)
- Multi-Spectral dynamic imaging makes it possible to add visible spectrum definition to infrared images in real time
- Option to automatically match the visible camera field of view to the infrared field of view for optimized documentation
- Wi-Fi connectivity allows you to send images and data from your camera to smart phones and tablets that have the FLIR Tools mobile app
- Blend thermal images and visible light images as well as useable picture-in-picture mode with window sizing
- Add up to a total of 5 box areas and 5 moveable spots to get more detailed information
- Using METERLiNK allows you to transmit vital information from clamp and moisture meters directly to the camera wirelessly
- Use a bluetooth headset to add voice annotations or use the on-board touch screen for text annotations
- InstantReport allows you to create a PDF document directly from the camera



(<http://messenger.providesupport.com/messenger/1e37kpwidthfwx1sgebtny9cydx.html>)



Try Prime

All ▾ flir

Shop by Department ▾

Your Amazon.com

Today's Deals

Gift Cards

Sell

Help

Hello, Sign in Your Account ▾

Try Prime ▾

Wish List ▾

0 Cart

1-16 of 4,157 results for "flir"

Choose a Department to sort

Narrow your choices

Industrial & Scientific

- Thermal Imagers
- + See more

Sports & Fitness

- Hunting Night Vision
- Rifle Scopes
- Electronics & Gadgets

Electronics

- Security & Surveillance Equipment
- Home Security Systems
- Marine Electronic Radar Systems

Camera & Photo

- Binoculars, Telescopes & Optics
- Monoculars
- Digital Cameras
- Surveillance DVR Kits
- Binoculars
- Remote Home Monitoring Systems
- Bullet Surveillance Cameras
- Digital Point & Shoot Cameras

+ See All 29 Departments

Eligible for Free Shipping
Free Shipping by Amazon

Brand

- FLIR
- FLIR Systems, Inc.
- Yukon
- Fluke
- Black & Decker
- Firefield
- Seek
- Bushnell
- Armasight
- FLIR-Digimerge
- Kingston
- Flir Maritime US
- Factory Direct
- NAV-TV

System of Measurement

- Inch
- Metric

Rifle Scope Lens Diameter

- Under 30 mm
- 30 to 32 mm
- 33 to 39 mm
- 40 to 42 mm
- 43 mm & Above

Optical Zoom

- 3.9x & Under
- 4x to 9.9x
- 10x to 19.9x
- 20x to 49.9x
- 50x & Above

Thermal Camera for Smartphones - See the Unseen

Shop now ▶

Related Searches: flir one, night vision, thermal camera.



FLIR ONE Thermal Imaging Equipment for Android Devices

by FLIR

\$249.99

Usually ships in 1 to 2 months

FREE Shipping on orders over \$35

Product Features
FLIR ONE allows you to measure temperature variances

Electronics: See all 791 items

Sponsored



Seek Thermal XR Extended Range...

\$299.00

(93)

Ad Feedback



FLIR ONE Thermal Imager for iPhone 5/5s

by FLIR

\$149.00

Only 16 left in stock - order soon.

FREE Shipping on orders over \$35

More Buying Choices
\$149.00 new (6 offers)

Product Description
... FLIR ONE is a lightweight accessory that transforms your iPhone 5 or 5s ...

Electronics: See all 791 items



FLIR TG165 Spot Thermal Camera

by FLIR Systems, Inc.

\$399.99 ~~\$499.99~~

Get it by Thursday, Sep 17

More Buying Choices
\$399.00 new (11 offers)

FREE Shipping on orders over \$35

Product Features
Featuring FLIR's Innovative Lepton IR Imaging Engine

Tools & Home Improvement: See all 499 items