HOBO® FlexSmart™ Logger-New!

Onset's new HOBO® FlexSmart™ Logger is a modular, reconfigurable data logging system for energy and industrial monitoring applications. The 15-channel system enables energy and facility management professionals to quickly and easily solve a broad range of monitoring applications without having to purchase a toolkit full of loggers. Innovative, snap-in FlexSmart signal conditioning modules convert signals from nearly any type of sensor, and a suite of pre-defined plug-and-play smart sensors and powerful HOBOware® software make set-up and deployment fast and easy.

The HOBO FlexSmart Logger accepts up to 3 two-channel FlexSmart modules and 6 plug-and-play smart sensors. HOBOware® Software provides easy logger launch, data readout, and plotting.

Dimensions (with modules): 15.4 x 9.4 x 5.1 cm (6.06 x 3.69 x 2.00")
Weight (without modules): 418.7 g (14.77oz)

Features:

1 to 15 data channels
6 Smart Sensor input jacks for Temp, RH, pulses
3 slots for optional FlexSmart Analog and True RMS modules
- 2-channel FlexSmart Analog module
  - Accepts 0-20mA and 0-20 VDC sensor inputs
  - +/-0.25% FS Accuracy from 50 mV to FS
  - 12V sensor excitation power supplied by logger, with programmable warm-up times
- 2-channel FlexSmart True RMS module
  - Accepts AC current transformer (CT) and/or potential (voltage) transformer (PT) inputs
  - Accurate measurement of sinusoidal and non-sinusoidal wave forms

Configuration is retained in FlexSmart modules
Large 512K non-volatile logger memory for long-term deployments
Flexible power options: internal batteries, external battery, and/or AC power adapter
Data Shuttle available end Q1 2006
Rugged case with optional mounting brackets

Measurements:

Temperature
Relative Humidity (RH)
AC Current (True RMS)
AC Voltage (True RMS)
kW
kWh
Gauge Pressure
Differential Air Pressure
CO_2
Pulse inputs for electric, gas, or flow meters
Other third-party sensors via 4-20mA/0-20 VDC
Weather sensors

Applications:

Building Research
Energy Audits
HVAC/R Diagnostics
M & V of Energy Savings
Building Commissioning
Performance Verification
Compressed Air Studies
Environmental Monitoring
Equipment Sizing
Submetering
Regulatory Compliance
Indoor Air Quality (IAQ) Studies
Machine Condition Monitoring

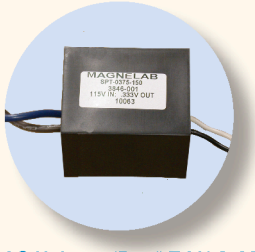
HOBOware compatible
U- Shuttle-compatible
Compliant with all relevant directives in the European Union (EU)

For ordering information, please see page 17.

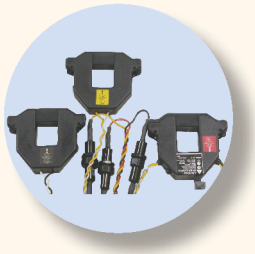
HOBO® FlexSmart™ Logger System

FlexSmart TRMS Module Sensors

AC Current
(Part# T-MAG-SCT-XXX)
Split-Core AC Current Transformers (CTs) from Magnelab snap open for placement around a current-carrying wire and contain an internal burden resistor for safety. When used with the FlexSmart TRMS Module, these sensors provide accurate measurement of sinusoidal and non-sinusoidal waveforms.
Ranges (AC Amps): 0-20, 0-50, 0-100, 0-200, 0-600
Sensor Accuracy: +/-1% (from 10% to 130% of rated current)
Use with: FlexSmart TRMS module (S-FS-TRMSA)

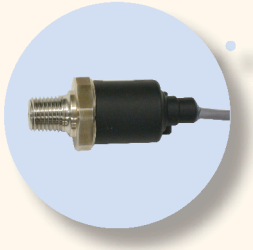


AC Voltage (Part# T-MAG-SPT-XXX)
AC Potential (Voltage) transformers (PTs) from Magnelab are used with the FlexSmart TRMS Module to provide accurate measurement of AC voltage. **Because these sensors tie directly into the line, they should be used only by qualified personnel.**
Range (AC Volts): 0-150, 0-300, 0-600 volts
Frequency: 50/60 Hz AC
Sensor Accuracy: +/-1% (from 10% to 130% of rated voltage)
Use with: FlexSmart TRMS module (S-FS-TRMSA)

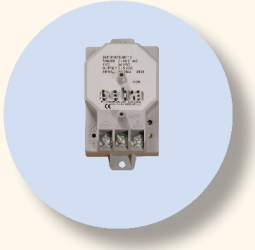


FlexSmart Analog Module Sensors

Kilowatt (kW) Power (Part# T-VER-8044-100)
The Veris kW Transducer incorporates three split-core AC current sensors and three voltage leads and outputs a signal proportional to kilowatts of power (demand). **Because these sensors tie directly into the line, they should be used only by qualified personnel.**
Range: 480 VAC, 100Amps
Transducer accuracy: +/-1%
Frequency: 50/60 Hz
Use with: FlexSmart Analog module (S-FS-CVIA)



Gauge Pressure (Part# T-ASH-G2-XXX)
Ashcroft Gauge Pressure sensors provide precision pressure measurements in compressed air systems, water, or other compatible gases and fluids.
Ranges: 0-100, 200, 500 psig
Sensor Accuracy: ±1% of span from -20° to 85°C (-4° to 185°F)
Use with: FlexSmart Analog module (S-FS-CVIA)



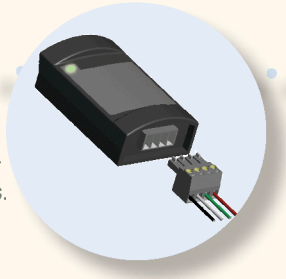
Differential Air Pressure (Part# T-SET-265-XXX)
A range of Setra sensors can be used for static or differential pressure in air or non-conducting gases. These sensors are fully protected against reverse wiring and against over-pressure to 10psi.
Ranges: 0-0.25", 0-1", 0-2.5", 0-5", 0-10" WC
Sensor Accuracy: +/-1% FS
Use with: FlexSmart Analog module (S-FS-CVIA)

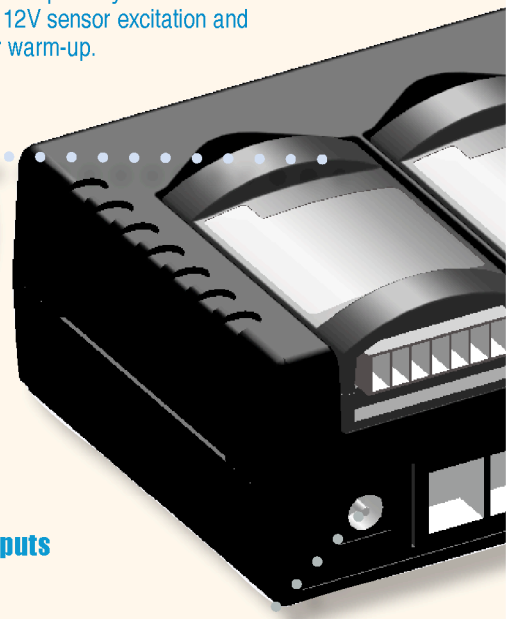
Carbon Dioxide/Temperature (Part# TEL-7001)
The Telaire 7001 CO_2 monitor measures and displays carbon dioxide and temperature levels, with built-in ventilation calculations. Carbon dioxide and temperature can be output for recording by the HOBO FlexSmart module.
Output ranges: 0 to 4000 ppm CO_2; 0°-40°C (32°-104°F)
Sensor Accuracy: ±50 ppm or ±5% of reading, whichever is greater; ±1°C (±2°F)
Use with: FlexSmart Analog module (S-FS-CVIA)

Duct-Mount Humidity/Temperature
(Part# T-VAI-HMD-40Y)
The Vaisala duct-mount humidity/temperature sensor combines excellent stability and reliable operation in air ducts.
Range: 10 to 90% RH; -10° to 60°C (14° to 140°F)
Sensor Accuracy: better than ±3% RH at +20°C/68°F; ±0.3°C (± 0.54°F) at 25°C/77°F
Use with FlexSmart Analog module (S-FS-CVIA)

FlexSmart Modules

Optional FlexSmart True RMS and Analog Modules mount on the top of the logger to provide maximum system flexibility. These two-channel modules let you incorporate AC Current or Potential (voltage) transformers or sensors with 0-20mA or 0-20 VDC outputs. Each channel can be configured separately. The FlexSmart Analog module provides 12V sensor excitation and user-configurable sensor warm-up.





FlexSmart True RMS inputs
AC Current
AC Voltage

FlexSmart Analog Inputs
kW
Gauge Pressure
Differential Air Pressure
CO_2
Duct-mount RH/Temp
Additional third-party sensors via 4-20mA, 0-20 VDC

Power

The HOBO FlexSmart Logger is powered by 8 AA internal batteries, standard automotive battery, or optional AC adapter.

For ordering information, please see page 17.

Status LEDs

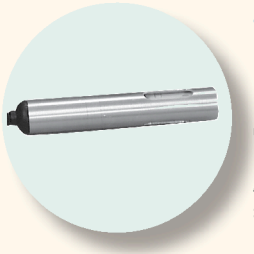
Six LEDs provide logger and communication status.

Communications

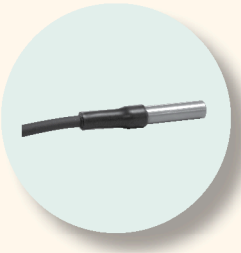
The HOBO FlexSmart Logger communicates to PC via serial stereo plug. A DB9 connector supports additional communications options.

Smart Sensors

Smart sensors plug directly into RJ-12 jacks on the front of the HOBO FlexSmart Logger. Smart sensors are automatically identified by the HOBO FlexSmart Logger at time of system launch—no configuration or other connections are required!



Temperature/RH Smart Sensor (Part # S-THA-M0XX)
Measurement Ranges: -40° to 75°C (-40° to 167°F);
0 to 100% RH from 0° to 50°C (32° to 122°F)
Accuracy: ± 0.7° @ 25°C (1.3° @ 77°F);
± 3% RH over the range of 0° to 50°C (32° to 122° F)

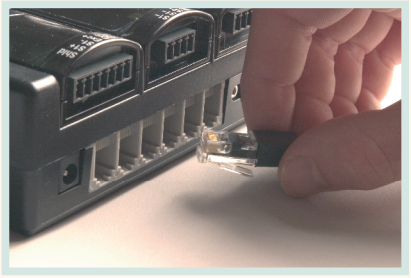


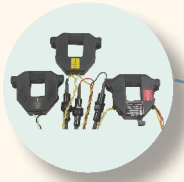
8-Bit Temperature Smart Sensor (Part # S-TMA-M0XX)
Measurement Range: -40° to 100° C (-40° to 212° F) sensor tip
Accuracy: ± 0.7° at 25° C (1.3° at 77° F)
Drift: < 0.1° C (0.2° F) per year

12-Bit Temperature Smart Sensor (Part # S-TMB-M0XX)
Measurement Range: -40° to 100° C (-40° to 212° F) sensor tip
Accuracy: ± 0.2°C from 0° to 50°C (±0.36° F from 32° to 122° F)
Drift: < 0.1° C (0.2° F) per year

Smart Sensor Inputs

Temperature
RH
kWh
Pulses
Additional Weather sensors (pgs. 32 to 34)





Kilowatt Hour Transducer (Part # T-VER-805X-XXX)
Veris 805x-series transducers are self-contained units incorporating split-core AC current sensors with processing electronics and voltage leads for monitoring kilowatt hours of energy used. The transducers provide pulse output of kWh. Single-phase systems include 1 CT and 1 Voltage lead; 3-phase systems include 3 CTs and 3 voltage leads. **Because these sensors tie directly into the line, they should be used only by qualified personnel.**
Ranges: 208 to 480 VAC; 300 Amps, 1-phase (T-VER-8051-300);
800 Amps, 3-phase (T-VER-8053-800)
Transducer accuracy: +/-1% (3-phase transducer conforms to ANSI C12.1 standard)
Use with: Pulse Input Adapter (S-UCA-M006)

Pulse Input Adapter (Part # S-UCA-M006)
The Pulse Input Adapter is ideal for connecting sensors with pulse outputs such as flow meters, power meters, and gas meters. The adapter is compatible with the WattNode as well as with Veris series 8050 Kilowatt Hour Transducers. Compatible with electronic switch closures, such as FET or open-collector outputs, or CMOS-level logic signals.
Maximum input frequency: 120 Hz

Kilowatt Hour Transducer (Part #T-WNA-3X-XXX)
The WattNode kWh Transducer works with Magnelab CTs and a Pulse Input Adapter (described and sold separately) to provide True RMS kilowatt hours of energy used, even for loads with non-sinusoidal waveforms.
Because these sensors tie directly into the line, they should be used only by qualified personnel.
Ranges: 208/240 VAC and 480 VAC ±15% Delta and Wye systems
Transducer accuracy: +/-0.45% of reading
+/-0.05%FS through 25th harmonic
Use with: Pulse Input Adapter (S-UCA-M006)

For ordering information, please see page 17.

Detailed System Specifications

Data Channels: 15 maximum
Connectors: 6 RJ-12 smart sensor jacks
3 FlexSmart module slots
Memory: 512K non-volatile data storage
Memory Modes: Stop when full,
Wrap-around when full
Operational Indicators: 6 LEDs provide logging and communication status
Logging Interval: 1 second to 18 hours, user-specified
Logger Start Modes: Immediate, Push-button, or Delayed-start options
Power:
Internal Power:
• 8AA alkaline batteries standard, temp range -20 to 50°C (-4 to 122°F)
• optional lithium for wider temperature range -40 to 60°C (-40 to 140°F)
Battery life: 1 year typical, with up to 75mA sensor excitation, 1-second warm-up time, and 10-minute logging interval
External Power Connector:
• optional AC adapter
• compatible with standard automotive battery
Time Accuracy: 0 to 2 seconds for first data point and +/-5 seconds per week at 25°C (77°F)
Operating Range: -20 to 50°C (-4 to 122°F) with alkaline batteries; -40 to 60°C (-40 to 140°F) with optional lithium batteries
Communication: Serial via 3.5 mm jack (optional RS-232 to USB converter cable)
Data Communication: Status while logging, Offload while logging or stopped
Offload Speed: 4 minutes for full 512K off load; 38,400 bps
Logger Dimensions (without modules): 15.4 x 8.4 x 4.4 cm (6.06 x 3.31 x 1.75")
Logger Weight (without modules): 418.7 g (14.77 oz)

For ordering information, please see page 17.

HOBOware compatible

Compliant with all relevant directives in the European Union (EU)

U- Shuttle compatible

Configurable Input Modules

FlexSmart True RMS Current/Voltage Module:
2 input channels
Range: 5mV to 512mV input; compatible with 333mV FS output sensors
Maximum input: ±1V
Minimum input: 5mV
Accuracy: ±0.3% of reading ±0.5% FSR*
* *Crest factor may cause additional error*
Resolution: 12-bit
Field wiring: 2-wire via screw terminals
Sensors (Accepts any of the following sensors offered by Onset):
• AC Current (T-MAG-SCT-XXX)
Ranges: 0-20, 50, 100, 200, 600 Amps
• AC Voltage (T-MAG-SPT-XXX)
Ranges: 150, 300, 600 VAC nominal ranges
Dimensions: 3.5 x 5.7 x 1.9 cm (1.38 x 2.25 x 0.75")
Weight: 21.2 g (0.75 oz)

FlexSmart Analog Input Module:
2 single-ended input channels
User-configurable ranges: 0-20mADC, 0-20VDC (suitable for 2.5, 5, 10V sensors)
Accuracy: ±0.25% FS over range selected from 50 mV to FS
Resolution: 12-bit
Excitation power: 12V DC @ up to 200mA switched, with up to 2-minute warm-up in 5 msec increments
Field wiring: 2- or 3-wire via screw terminals
Sensors (accepts the following sensors offered by Onset):
• kW (T-VER-8044-100)
• Gauge Pressure (T-ASH-G2-XXX)
Ranges: 100, 200, 500 psig
• Differential Pressure (T-SET-265-XXX)
Ranges: 0.25", 1", 2.5", 5", 10" WC
• Duct Mount RH/Temp (T-VAI-HMD-40Y)
Range: 10% to 90% RH; -10° to 60°C (14° to 140°F)
• Carbon Dioxide/Temp (TEL-7001)
Measurement/display range: 0-10,000 ppm; 0° to 50°C (32° to 122°F)
Output ranges to module: 0-4000 ppm; 0° to 40°C (32° to 104°F)
Dimensions: 3.5 x 5.7 x 1.9 cm (1.38 x 2.25 x 0.75")
Weight: 21.8 g (0.77 oz)

FlexSmart Analog Input Module

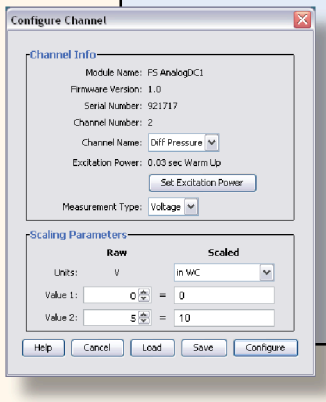
The FlexSmart analog module is an easy-to-configure and flexible DC input module that accepts a wide range of Onset or third-party sensors. The FlexSmart module accepts sensors with 0-20V or 0-20mA output (including devices with 4-20mA current loop interface). Precision electronics provide ±0.25% FS accuracy over the range 50 mV to FS.

How does it work?

It's easy.

1. Connect a two-wire or three-wire sensor or transducer to the FlexSmart module via screw terminals, and plug the FlexSmart module into the FlexSmart Logger.

2. Using the Software Configuration Tool in HOBOware® software, choose measured property/units, scaling of units, and sensor warm-up time. All configuration information is electronically stored in the module, allowing easy plug-and-play operation for future deployments.



3. Go to the HOBOware® launch screen and select "Launch Logger," then deploy the HOBO FlexSmart Logger in chosen location.

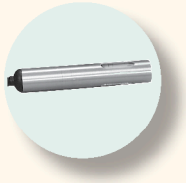
FlexSmart modules can be easily reconfigured to accept new sensors.

HOBO® FlexSmart™ Logger System Sensor Detailed Specifications*

The following sensors have been qualified by Onset for use with the HOBO FlexSmart Logger. Smart sensors are manufactured by Onset and are also compatible with HOBO Weather Station and Micro Station loggers; additional smart sensors for weather monitoring are also available (see pgs. 32 to 34). Third-party sensors listed have been tested for compatibility with the specified FlexSmart module. Sensor specifications and accuracies are as reported by the listed manufacturer and must be considered in addition to the FlexSmart module accuracy.

Many other third-party sensors can also be interfaced with the HOBO FlexSmart Logger using the FlexSmart True RMS or Analog modules. See FlexSmart module specifications for sensor output requirements.

Temperature/RH Smart Sensor (Part # S-THA-M0XX)



Measurement Ranges: -40° to 75°C (-40° to 167°F); 0 to 100% RH from 0° to 50°C (32° to 122°F)
Accuracy: ± 0.7° @ 25°C (1.3° @ 77°F); ± 3% RH over the range of 0° to 50°C (32° to 122° F); ± 4% in condensing environments 0° to 30°C (32° to 86°F)
Resolution: 0.4° @ 25°C (0.7° @ 77°F); 0.5% RH @ 25°C (77°F)
Drift: < 0.1°C (0.2°F) temp per year (typical); ± 1% RH per year; additional reversible RH drift up to 3% can occur when average RH exceeds 70%
Environment: RH sensor designed for outdoor environments with cyclical high/low humidity levels. Intermittent condensation permitted at temperatures <30°C (86°F).
Temperature Sensor Operating Range: -40° to 75°C (-40° to 167°F)
Response time: Temp: 8 minutes, RH: 5 minutes— typical to 90% in 2 m/sec airflow
Measurement averaging: No
Housing: Stainless steel
Dimensions: 1.6 x 8.6 cm (0.625 x 3.5")
Cable lengths: 2 m, 6 m, 17 m (6.5', 20', 56')
Weight: 60 g, 140 g, 370 g (2 oz, 5 oz, 13 oz) —varies with cable length
Data channels: 2

* *Sensor accuracies are in addition to FlexSmart module accuracies, where applicable.*

8-bit Temperature Smart Sensor (Part # S-TMA-M0XX)

Measurement Range: -40° to 100°C (-40° to 212° F) sensor tip
Accuracy: ± 0.7° @ 25°C (1.3° @ 77°F)
Resolution: 0.4° @ 25°C (0.7° @ 77°F)
Drift: < 0.1°C (0.2°F) per year
Environment: Sensor tip and cable rated for 1-year immersion in fresh water ≤50°C (122°F)
Response time: < 2 minutes typical to 90%, in 2 m/sec airflow
Measurement Averaging: No
Housing: Stainless steel sensor tip
Dimensions: 0.7 x 3.8 cm (0.28 x 1.5")
Cable lengths: 2 m, 6 m, 17 m (6.5', 20', 56')
Weight: 90 g, 140 g, 300 g (3.3 oz, 5.2 oz, 11.2 oz) varies with cable length
Data channels: 1

12-Bit Temperature Smart Sensor (Part # S-TMB-M0XX)

Measurement Range: -40° to 100°C (-40° to 212°F) sensor tip
Accuracy: ± 0.2°C from 0° to 50°C (±0.36°F from 32° to 122°F)
Resolution: 0.03°C from 0° to 50°C (±0.054°F from 32° to 122°F)
Drift: < 0.1°C (0.2°F) per year
Environment: Sensor tip and cable rated for 1-year immersion in fresh water ≤ 50°C (122°F)
Response Time: < 2 minutes typical to 90% in 2 m/sec airflow
Measurement Averaging: Yes
Housing: Stainless steel sensor tip
Dimensions: 0.7 x 3.8 cm (0.28 x 1.5")
Cable Lengths: 2 m, 6 m, 17 m (6.5', 20', 56')
Weight: 90 g, 140 g, 300 g (3.3 oz, 5.2 oz, 11.2 oz) —varies with cable length
Data channels: 1

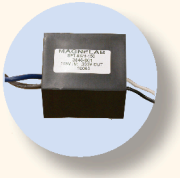
Pulse Input Adapter (S-UCA-M006)

Compatibility: electronic switch closures, such as FET or open-collector outputs, or CMOS-level logic signals
Maximum input frequency: 120 Hz (120 pulses per second)
Lockout time: 45 µs ±10%
Preferred pulse polarity: active low; pulses of opposite polarity can be used, but battery usage rate will be higher.
Measurement Range: 0-4093 counts per logging interval (data must be exported for conversion to other units)
Minimum pulse width: 1 ms
Maximum input voltage: 3.6V
Minimum input voltage: -0.3V
Logic levels: low ≤ 0.6V; high ≥2.7V
Edge detection: falling edge
Input/Output impedance: 100 kilohms
User connection: 2-wire input (24 AWG wire; 2 wire nuts incl.)
Cable length: 6.5m (21 ft)
Weight: 310 g (11 oz)
Data Channels: 1

Magnelab AC Current Transformer (Part # T-MAG-SCT-XXX)

Measurement ranges: 0-20, 0-50, 0-100, 0-200, 0-600 Amps AC
Accuracy: +/-1% (from 10% to 130% of rated current)
Phase angle: <2 degrees (valid for 150A or higher)
Output signal to FlexSmart: 0.333V at rated current
UL recognized
Epoxy encapsulated housing
Leads – 8-ft twisted pair, 22 AWG
Snap closing/opening
Internal precision burden resistor
Opening dimensions: 20 Amp: 1.9 cm (0.75"); 50, 100, 200 Amp: 3.2 cm (1.25"); 600 Amp: 5 cm (2.0")
Requires FlexSmart TRMS Module (S-FS-TRMSA)
Data channels: 1

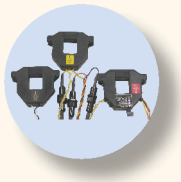
Magnelab AC Potential (Voltage) Transformer (Part # T-MAG-SPT-XXX)



Measurement ranges: 0-150, 0-300, 0-600 Volts AC
Accuracy: +/-1% (from 10% to 130% of rated voltage)
Phase angle < 1 degree
Output signal to FlexSmart: 0.333 Volt RMS at nominal rated input
Connections: 8-ft PVC insulated wire, UL 1015
High voltage input: #14 AWG blue/brown
Low voltage output: #22 AWG twisted pair, black/white
Epoxy filled ABS plastic construction
Dimensions: 5.5 x 3.9 x 3.1 cm (2.2" x 1.6" x 1.2")
Weight: 491.2 g (17.33 oz)
Requires FlexSmart TRMS Module (S-FS-TRMSA)
Data Channels: 1

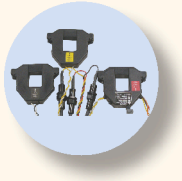
For ordering information, please see page 17.

Veris kW Transducer
(Part # T-VER-8044-100)



Includes 3 100-Amp Split Core Current Transformers (CT) and voltage leads
Input primary voltage: 480 Volts AC rms
Accuracy: +/-1% per ANSI C12.1 (from 10 to 100% of CT rating)
Number of phases monitored: Three
Frequency: 50/60 Hz
CT range: 0 to 100 Amp AC
Internal isolation: 2000 VAC rms
Insulation class: 600 VAC rms
Operating temp range: 0° to 60°C (32° to 140°F)
Operating humidity range: 0 to 95% RH, non-condensing
Output signal to FlexSmart: 4-20mA
Supply powered (current loop): 9-30 VDC, 30mA max
Opening dimensions of each CT: 3.8 x 3.2cm (1.5 x 1.25")
Requires FlexSmart Analog Module (S-FS-CVIA)
Data channels: 1

Veris kWh Transducer
(Part # T-VER-805X-XXX)



Includes Split-Core Current Transformers (CT) and Voltage leads
Input primary voltage: 208 or 480 VAC
Accuracy: +/-1% (3-phase model conforms to ANSI C12.1 metering standards)
Number of phases monitored: One or Three
Frequency: 50 to 60Hz
CT range: 0-300 Amp (T-VER-8051-300); 0-800 Amp (T-VER-8053-800)
Circuit connection: 3- or 4-wire
Maximum output current: 100mA@24VAC/DC
Operating temp range: 0° to 60°C (32° to 140°F)
Operating humidity range: 0-95% RH (non-condensing)
Output signal to FlexSmart logger: Pulse (Normally open Opto-FET)
Pulse Width: 200 msec
Opening dimensions of each CT:
T-VER-8051-300: 3.8 x 3.2 cm (1.5 x 1.25")
T-VER-8053-800: 7.3 x 6.2 cm (2.9 x 2.5")
Requires Pulse Input Adapter (S-UCA-M006)
Data channels: 1

* *Sensor accuracies are in addition to FlexSmart module accuracies, where applicable.*

WattNode kWh Energy Consumption
(Part # T-WNA-3X-XXX)

Accepts Magnelab AC Current Transformers (sold separately)
Wye Configuration ranges: 208, 480, Volts AC
Delta Configuration ranges: 208, 480 Volts AC
Measurement configurations: 1-phase (1 CT required) or 3-phase (3 CTs required)
Line powered
Rating: FCC Class A
Operating voltage range: ±20% of nominal
Frequency: 60 Hz
CT input: 0-0.5 VAC operating, 3 VAC maximum
Accuracy: ±0.45% of reading +0.05% FS through 25th harmonic
Enclosure: high impact, UL rated ABS plastic
Connectors: UL, CSA recognized, detachable screw terminals (14 AWG), 600V
Operating temp range: -30° to 60°C (-22° to 140°F)
Operating humidity range: 0 to 90% RH, non-condensing
Dimensions: 8.4cm x 14.2cm x 3.2cm (3.3" x 5.6" x 1.25")
Requires Pulse Input adapter (S-UCA-M006) and Magnelab CTs
Data channels: 1

Ashcroft® Gauge Pressure Sensor
(Part # T-ASH-G2-XXX)

Measurement ranges: 100, 200, 500 psig
Compensated temp range: -40° to 125°C (-40° to 257°F)
Accuracy: ±1% FS from -20° to 85°C (-4° to 185°F); ±1.5% FS -40° to -20°C and 85° to 125°C (-40° to -4°F and 185° to 257°F)
Non-linearity: less than ±0.1% of span typical
Non-repeatability: less than ±0.03% of span typical
Hysteresis: less than ±0.01 of span typical
Stability: less than ±0.25% of span/year
Durability: tested to 50 million cycles
Overpressure: 200% FS
Response time: less than 1 msec
Power: 9-36 VDC, 5mA
Operating temp range: -40° to 125°C (-40° to 257°F)
Operating humidity range: 0 to 100% RH, no effect
Output signal to FlexSmart module: 0-5 VDC, 3 wire
Reverse polarity protected
Insulation breakdown voltage: 100 VAC
Insulation resistance: greater than 100 megohms at 100 VDC
Shielded cable, 24 AWG, PVC jacket, 1-meter
Pressure connection: 1/4" NPT 304 stainless steel
Sensor material: 17-4PH stainless steel
Housing material: 20% glass reinforced nylon, fire retardant to UL94 V1
CE Compliance: Per EN 61326: 1997 + A1: 1998 + A2: 2001, Annex A (Heavy Industrial)
Dimensions: 6.4 cm x 2.9 cm diam (2.5" x 1.15" diam)
Weight: 89.4 g (3.15 oz)
Requires FlexSmart Analog module (S-FS-CVIA)
Data channels: 1

Setra Differential Pressure Sensor
(Part # T-SET-265-XXX)

Measurement ranges: 0.25", 1", 2.5", 5", 10"WC
Accuracy (RSS): ±1% FS (Root Sum Squares of Non-Linearity, Non-Repeatability, Hysteresis)
Compensated temp range: -18° to 65°C (0° to 150°F)
Over pressure: 10 psi
Operating temp range: -18° to 65°C (0° to 150°F)
Connection: screw terminal strip
Pressure fittings: 1/4" fitting
Circuit: 3-wire
Excitation power: 9 to 30 VDC
Output to FlexSmart module: 0-5 VDC
Output impedance: 100 Ohms
Pressure media: typically air or similar non-conducting gases
Case materials: fire retardant glass filled polyester
Dimensions: 8.9 x 5.1 x 4.1 cm (3.5 x 2.0 x 1.6")
Weight: 95g (3.35 oz)
Requires FlexSmart Analog module (S-FS-CVIA)
Data channels: 1

Vaisala Duct Mounted RH/Temp Transmitter (Part # T-VAI-HMD-40Y)

RH Measurement range: 10 to 90% RH
RH Accuracy at 20°C (68°F): better than ±3% RH
Stability: ±2% RH over 2 years
Temperature dependence: less than ±1.5% RH from –10° to 60°C (14° to 140°F)
Temperature Measurement range: -10° to 60°C (14° to 140°F)

Accuracy at 25°C (77°F): ±0.3°C (±0.54°F)
Temperature dependence: 0.01°C/°C (0.01°F/°F)
Operating temp range: -10° to 60°C (14° to 140°F)
Operating humidity range: 0 to 100% RH
Output signal to FlexSmart: 4-20 mA
Load resistance: greater than 20 kohm
Power supply: 10 to 28 VDC
Current consumption: 4 mA minimum
Housing material: ABS plastic
Complies with EMC standard EN61326-1:1997 + AM 1:1998, generic environment
Dimensions: 30.2 x 8.0 cm x 1.5 cm dia (11.9 x 3.1 x 0.6" dia)
Requires FlexSmart Analog module (S-FS-CVIA)
Data channels: 1 (RH or Temp only) or 2 (RH and Temp)

Telaire Carbon Dioxide (CO_2)/Temp Monitor (Part # TEL-7001)

CO_2 Measurement/display range: 0 to 10,000 ppm
Output signal to FlexSmart module: 0 to 4 VDC, representing 0-4000ppm
Output impedance = 100ohms
Sensitivity: ±1ppm
Accuracy: ±50 ppm or +/-5% of reading, whichever is greater
Repeatability: ±20 ppm
Temperature dependence: ±0.1% of reading per °C or ±2 ppm per °C, whichever is greater, referenced to 25°C (77°F)
Annual drift: ±20 ppm typical
Response time: less than 60 seconds to 90%
Warm-up: less than 60 seconds @ 22°C
Temperature measurement/display range: 0° to 50°C (32° to 122°F)
Output signal to FlexSmart module: 0 to 4 VDC representing 0° to 40°C (32° to 104°F)
Accuracy: ±1°C (±2°F)
Response time: 20 to 30 minutes
Requires FlexSmart Analog Module (S-FS-CVIA) and Cable (CABLE-2070)
Data channels: 1 (CO_2 or Temp only) or 2 (CO_2 and Temp)

Accessories

AC Power Adapter (Part # P-AC-1)

The AC Power Adapter lets you power the HOBO FlexSmart Logger from an AC power source. The AC Power Adapter is a switched supply, so there is no need to remove the logger batteries, and it can be used with AC power sources from 100 to 240 VAC, 50 or 60 Hz.

Mounting Feet Kit (Part # A-H22-MOUNT-1)
Optional mounting feet attach to the back of the HOBO FlexSmart Logger to allow for more permanent mounting using standard 3/8" flathead screws (included).

DIN Mount Kit (Part # A-H22-DINMOUNT-1)
When used with the Mounting Feet Kit above, the HOBO FlexSmart Logger snaps securely to standard 32 mm and 35 mm DIN rails.

HOBO® FLEXSMART™ LOGGER ORDERING:

Description	Part No.
HOBO FlexSmart Logger	H22-001
FlexSmart TRMS Module	S-FS-TRMSA
FlexSmart Analog Module	S-FS-CVIA
U-Shuttle	U-DT-1

HOBOware® software and a Serial Interface Cable are required for operation of HOBO FlexSmart loggers. For use with USB ports USB-Serial Adapter is also required (pg 49).

HOBOware (Windows) Software	BHW-PC
HOBOware (Mac) Software	BHW-MAC
Serial Interface Cable	CABLE-PC-3.5
USB-Serial Adapter	CABLE-USB232

Sensors
Smart Sensors (plug-and-play, no module required) See pgs 32 – 34 for additional weather-related smart sensor options

Temperature/RH	
2-m cable	S-THA-M002
6-m cable	S-THA-M006
17-m cable	S-THA-M017
8-bit Temperature	
2-m cable	S-TMA-M002
6-m cable	S-TMA-M006
17-m cable	S-TMA-M017
12-bit Temperature	
2-m cable	S-TMB-M002
6-m cable	S-TMB-M006
17-m cable	S-TMB-M017
Pulse Input adapter	S-UCA-M006

kWh Transducers (the following transducers require a Pulse Input Adapter smart sensor (Part # S-UCA-M006)

WattNode kWh (Magnelab CTs sold below and Pulse Input Adapter required)	
Wye config 208/240	T-WNA-3Y-208
Wye config 480	T-WNA-3Y-480
Delta config 208/240	T-WNA-3D-240
Delta config 480	T-WNA-3D-480
Veris kWh (Pulse Input Adapter required)	
1-phase, 300 Amp	T-VER-8051-300
3-phase, 800 Amp	T-VER-8053-800

True RMS Current and Voltage - the following CTs and PTs require a FlexSmart TRMS Module (Part #S-FS-TRMSA)

Magnelab Split-Core AC Current	
0-20 Amp	T-MAG-SCT-020
0-50 Amp	T-MAG-SCT-050
0-100 Amp	T-MAG-SCT-100
0-200 Amp	T-MAG-SCT-200
0-600 Amp	T-MAG-SCT-600
Magnelab AC Voltage (Potential)	
0-150 Volt	T-MAG-SFT-150
0-300 Volt	T-MAG-SFT-300
0-600 Volt	T-MAG-SFT-600

Analog Input Sensors - the following sensors require a FlexSmart Analog Module (Part #S-FS-CVIA)

Veris kW	T-VER-8044-100
Ashcroft Gauge Pressure	
100 psig	T-ASH-G2-100
200 psig	T-ASH-G2-200
500 psig	T-ASH-G2-500
Setra Differential Air Pressure	
0.25" WC	T-SET-265-R25
1" WC	T-SET-265-001
2.5" WC	T-SET-265-2R5
5" WC	T-SET-265-005
10" WC	T-SET-265-010
Vaisala Duct-Mount RH/Temp	T-VAI-HMD-40Y
Telaire CO2/Temp (requires CABLE-2070)	TEL-7001
Cable CO2/Temp to FlexSmart	CABLE-2070

Accessories

Mounting Feet Kit	A-H22-MOUNT-1
DIN Mount Kit (Requires A-H22-MOUNT-1)	A-H22-DINMOUNT-1
AC power adapter	P-AC-1

Smart Sensor Extension Cables (total cable length of all sensor cables is 100 meters (300 feet)

5-m length	S-EXT-M005
10-m length	S-EXT-M010
25-m length	S-EXT-M025
1-to-2 Sensor Adapter*	S-ADAPT

* when used with Smart Sensor Extension Cables, this allows a single smart sensor input to branch to two smart sensors

Lithium Batteries -4 pack (2 packs required)	HWSB-LI
H22 Spares kit (includes screwdriver, rubber bumper mounts, module connector covers)	A-H22-SPARES-1
FlexSmart TRMS Module spares kit (includes 4-pin screw terminals (4) and screwdriver)	A-FS-TRMSA-4P-1
FlexSmart Analog Module spares kit (includes 7-pin screw terminals (4) and screwdriver)	A-FS-CVIA-7P-1