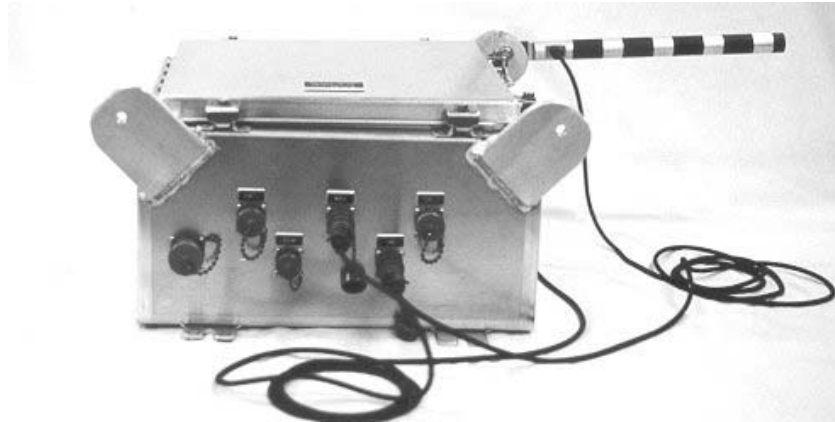


The Valley Group, Inc.

CAT-1™ Transmission Line Monitoring Systems

CAT-1 TRANSMISSION LINE MONITOR - SYSTEM DATA SHEET



Functional Description:

The CAT-1 system is designed to monitor the mechanical tension of the transmission conductor. Because the sag of any transmission span is inversely proportional to the horizontal component of the tension, the CAT-1 system can accurately report the actual clearance status, and IntelliCAT™ software can calculate conductor temperature, sag, and trends in tension to provide advance warning of impending clearance violations.

In addition to the tension measurements, the system takes ambient and NRS temperature measurements. This information is transmitted to a CATMaster Base Station located at a nearby substation, where it is then sent to the EMS/SCADA system using existing RTU communication channels. Once the data is received by the EMS/SCADA system, it is passed through proprietary software for processing. Once processed, the resulting thermal rating can be displayed and/or trended directly on the existing system operator's screen just as any other analog value.

The ambient temperature sensor is a highly accurate device that provides a reading with a resolution of 0.1°C. The sensor incorporates an aspirated shield and is mounted on the CAT-1 system enclosure.

The patented Net Radiation Sensor (NRS) is designed to provide approximately the same emissivity, absorptivity, cooling surface, and time constant as the conductor being monitored. The NRS is mounted to a separate mounting bracket at the height of the conductor, and is aligned to point parallel to the direction of the conductor being monitored. Therefore, the NRS will measure the temperature the conductor would attain if it were de-energized. This provides a baseline measurement for the calculation of the actual temperature of the energized conductor.

In cases where the CAT-1 system is installed at a structure location with a significant line angle (i.e. in excess of 20 degrees), a second NRS would be installed and aligned in the direction of the second line section to provide more accurate.

The CAT-PAC unit contains two high-temperature sealed lead-acid batteries, a temperature-compensating solar charging unit, and two 20W solar panels. The CATPAC provides enough power to keep the system operational for up to one week with no solar input (i.e. snow/ice cover, etc).

Also provided with the system is a 10dBm gain Yagi antenna, 50 ft / 15m of low-loss Helix antenna cable, and a weatherproofing kit. The weather proofing kit is used at the connection between the antenna and the cable to prevent moisture ingress into the feedline. The antenna must be mounted within line-of-sight of the receiving antenna. Custom lengths of cable in various sizes can be provided on request.

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CAT-1 Component List:

CAT-1 Main board
NEMA-4x Aluminum enclosure⁽¹⁾
Ambient temperature sensor
Net Radiation Sensor(s)
10 dB Yagi antenna
Helix antenna cable 50ft / 15m
Strain Gauge Load Cells (Sold separately - See Load Cell Data Sheet)

CATPAC Component List:

NEMA-4x Aluminum enclosure⁽¹⁾
Two (2) 12V 24Ah rechargeable high-temperature sealed lead acid batteries
Two (2) 20W solar panels
Temperature-compensating charge control module
Power switch and fuse panel
6ft / 2.5m umbilical cable

Specifications:

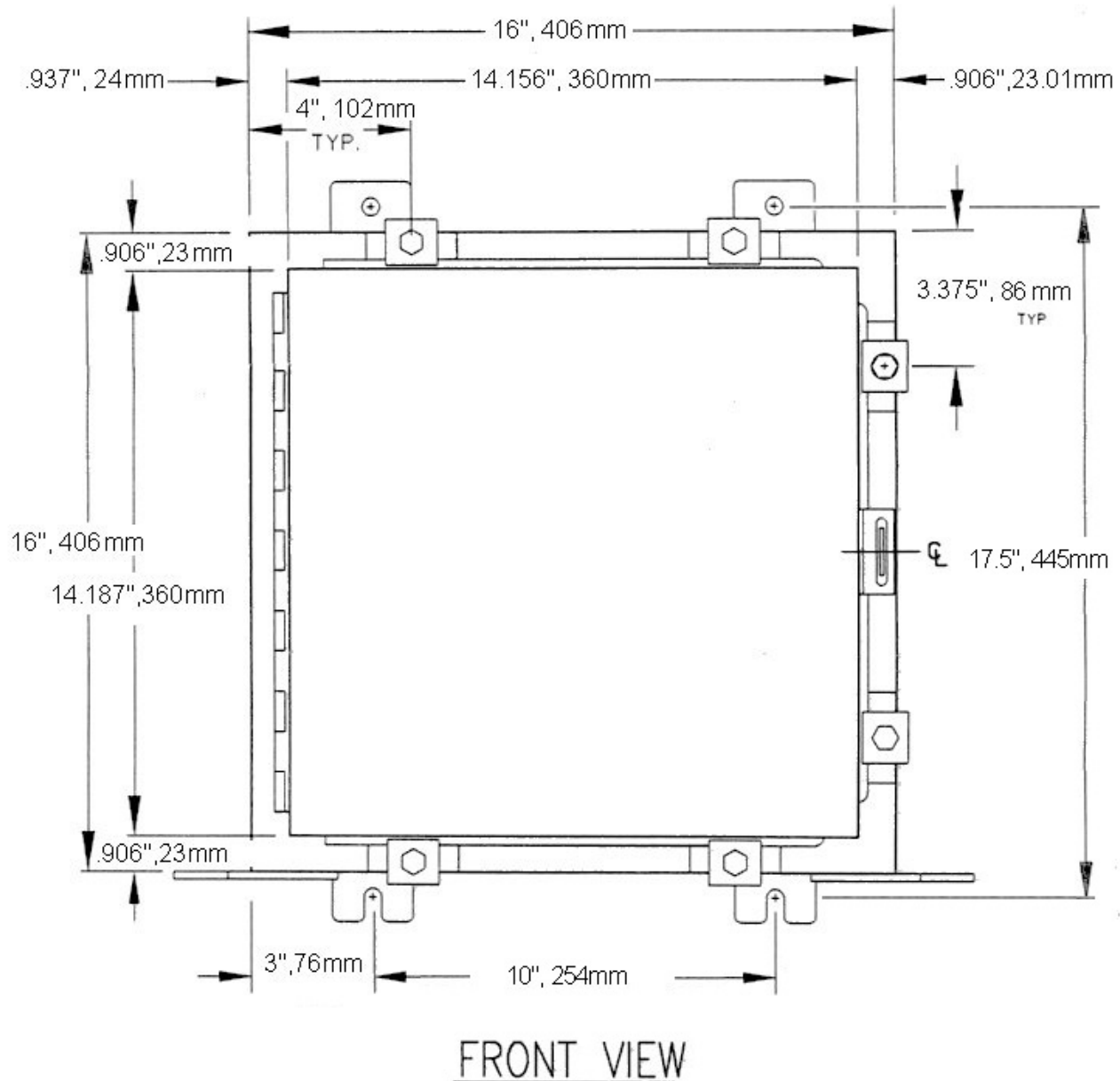
Operating temperature range	-40°C to 60°C
Operating time (no solar panel input, 68°C/20°C)	~7 days
Charging Current	2.0 amps max
Sensor Resolution (Ambient)	0.1 °C
(NRS)	0.1 °C
(Load Cell)	0.05 % full scale
NRS emissivity/absorbivity	0.8/0.8 (can be otherwise specified)
Spread-Spectrum Data Radio Frequency band	902-928 MHz
Frequency stability	1.5 ppm
Power output	0.1 to 1.0 watt
Approvals	FCC Part 15.247 UL 1419, UL/FM Class 1, Div; Groups A, B, C and D hazardous locations Industry Canada RSS-210
Antenna type	+10dB directional Yagi
Mounting	“U” clamp on up to 2” pipe
Directionality	30 degrees from center
Shipping weight: CAT-1, NRS, ambient, manual	44 lbs/20 kg
CATPAC, batteries, solar panels	73 lbs/33 kg

(1) NEMA-4x – National Electrical Manufacturers Association Type 4x.

Enclosures constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with the enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, wind blown dust, splashing water, hose-directed water, and corrosion; and that will be undamaged by the external formation of ice on the enclosure.

CAT-1™ Transmission Line Monitoring Systems

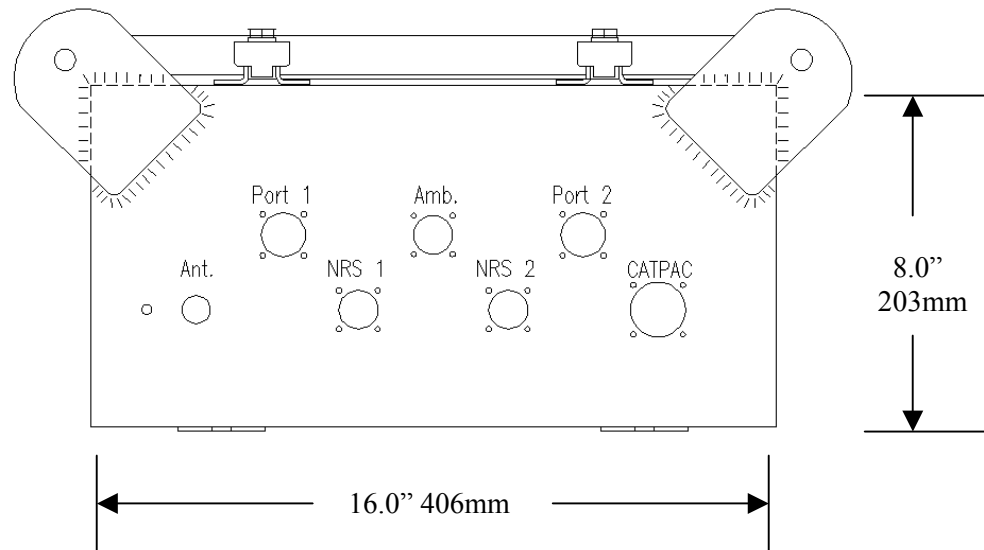
CAT-1 and CAT-PAC Enclosure Dimensions



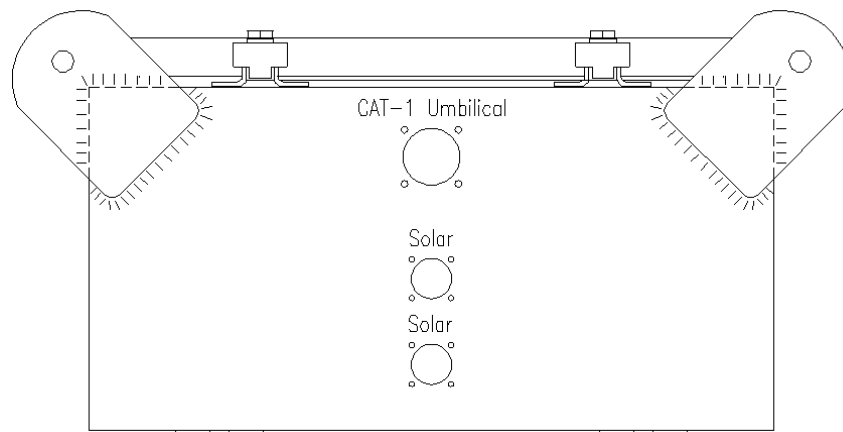
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CAT-1™ Transmission Line Monitoring Systems

CAT-1 Main Unit
Bottom View



CAT-PAC Unit
Bottom View



Yagi Antenna

