

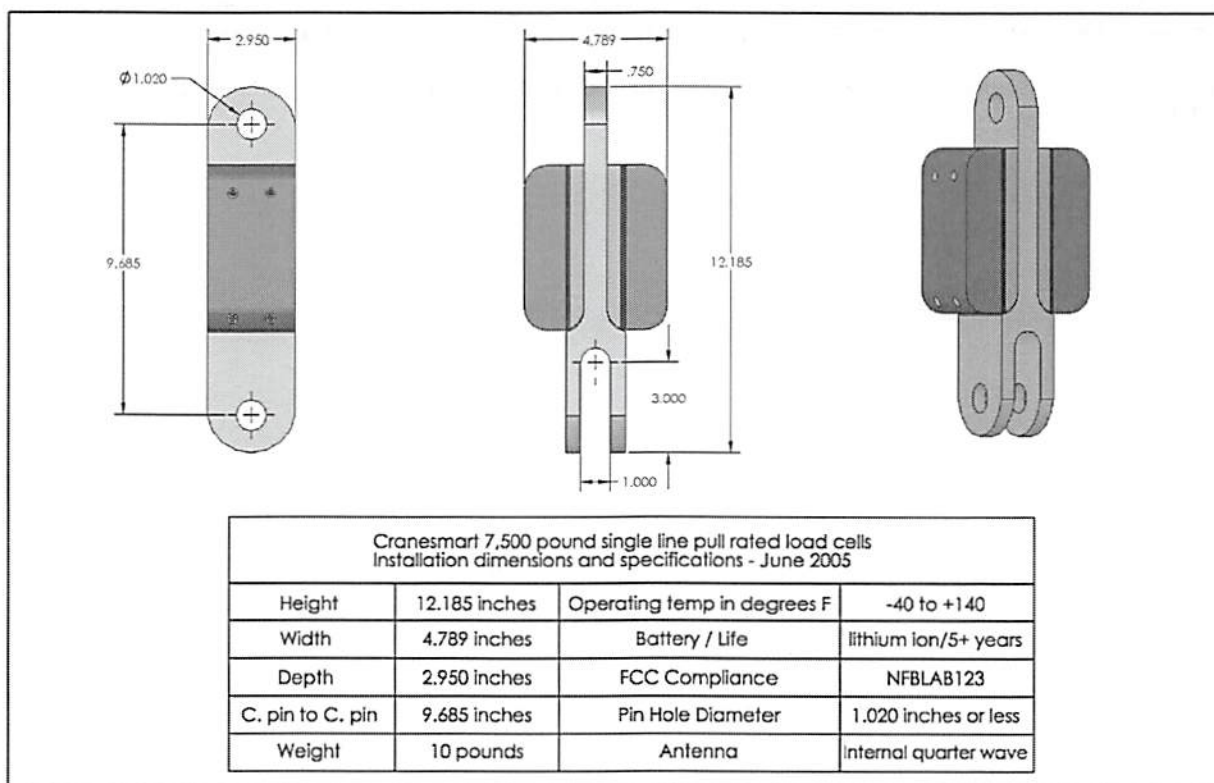
Function Shut Offs

Cranesmart Systems provide outputs for function shut offs. For example, the panel can be configured to interrupt the winch up function to prevent the operator from damaging the crane. Overload, A2B, angle and wind speed can also be used to shut the crane down in unsafe conditions. Outputs for the system are normally configured at the time of purchase to integrate into the crane's existing system or to match the shut offs provided with the system.

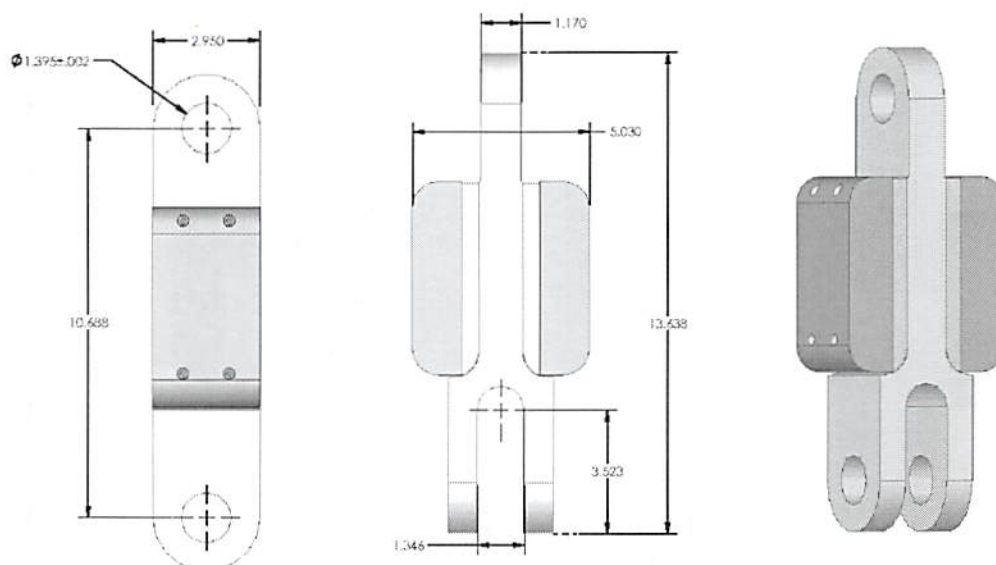
If you have specific requirements for alarms, displays or function shut offs call our sales department at (888) 562-3222 or (780) 437-2986.

Technical Specifications

7,500lb single line pull load cell



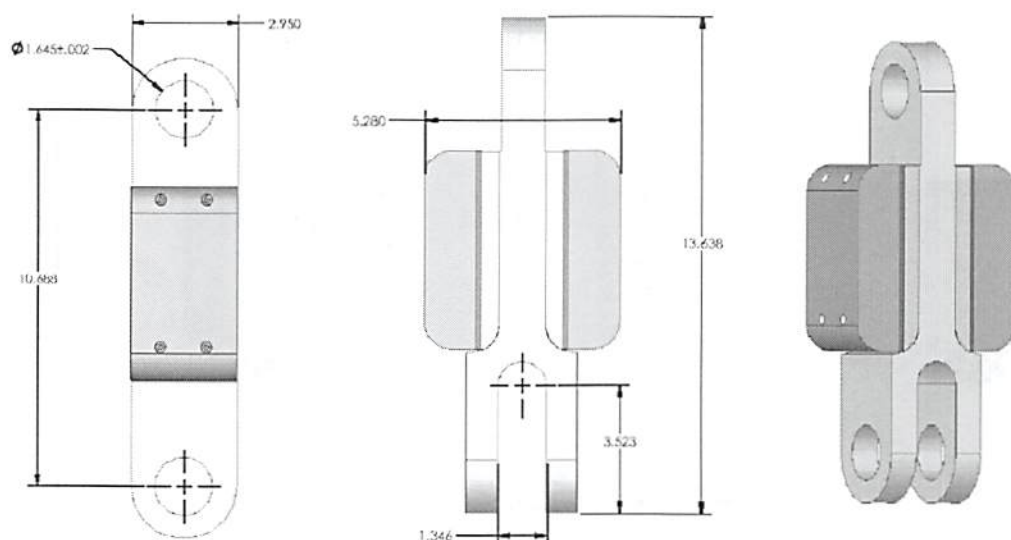
15,000 single line pull load cell



Cranesmart 15,000 pound single line pull rated load cells
Installation dimensions and specifications – June 2005

Height	13.63 inches	Operating temp in degrees F	-40 to +140
Width	5.05 inches	Battery / Life	lithium ion / 5+ years
Depth	2.95 inches	FCC Compliance	NFBLAB123
C. pin to c. pin	10.68 inches	Pin Hole Diameter	1.395 inches or less
Weight	14 pounds	Antenna	internal quarter wave

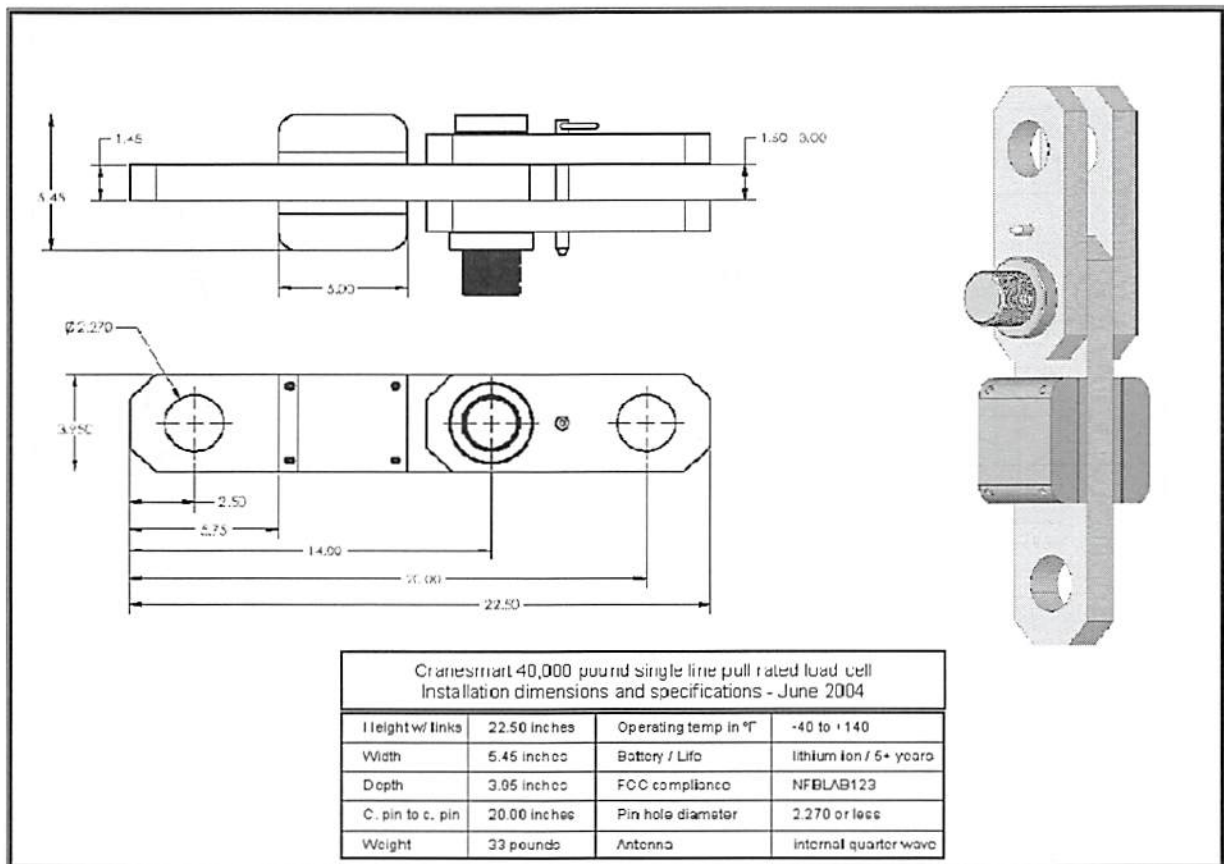
25,000lb single line pull load cell



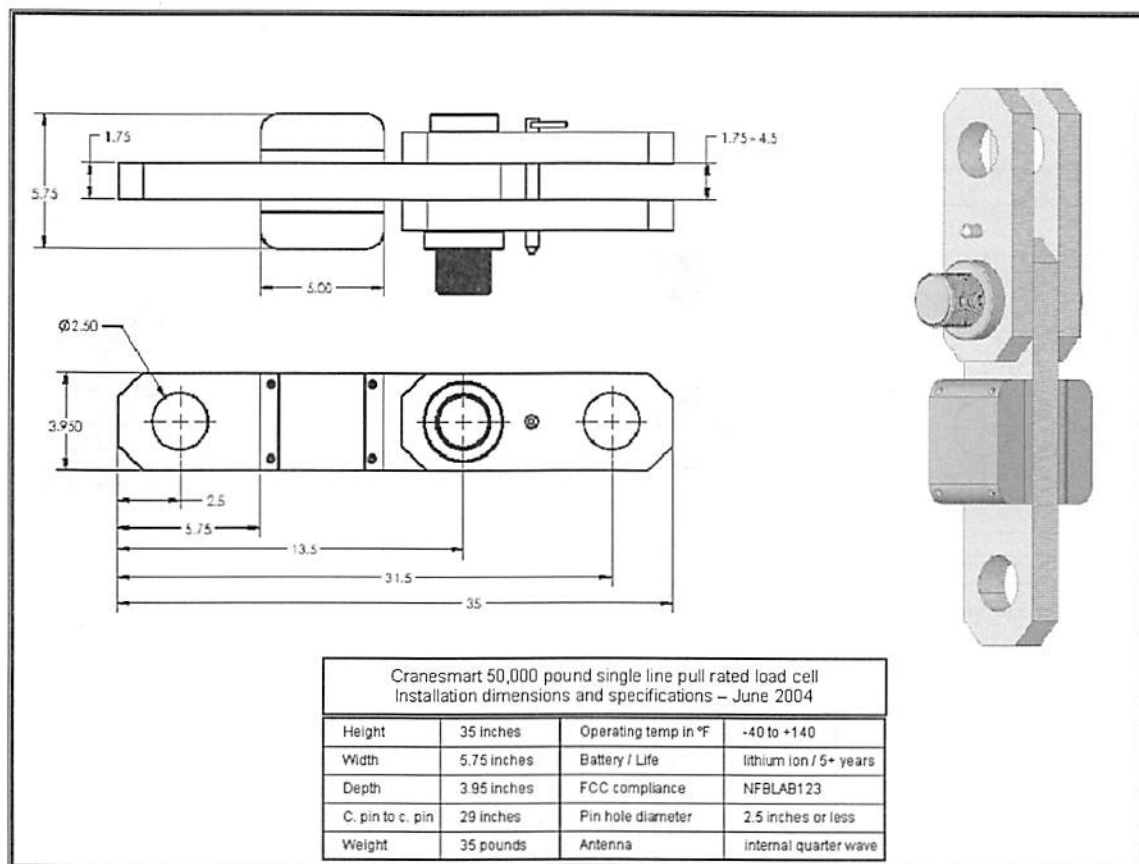
Cranesmart 25,000 pound single line pull rated load cells
Installation dimensions and specifications – June 2005

Height	13.63 inches	Operating temp in degrees F	-40 to +140
Width	5.05 inches	Battery / Life	lithium ion / 5+ years
Depth	2.95 inches	FCC Compliance	NFBLAB123
C. pin to c. pin	10.68 inches	Pin Hole Diameter	1.645 inches or less
Weight	14 pounds	Antenna	internal quarter wave

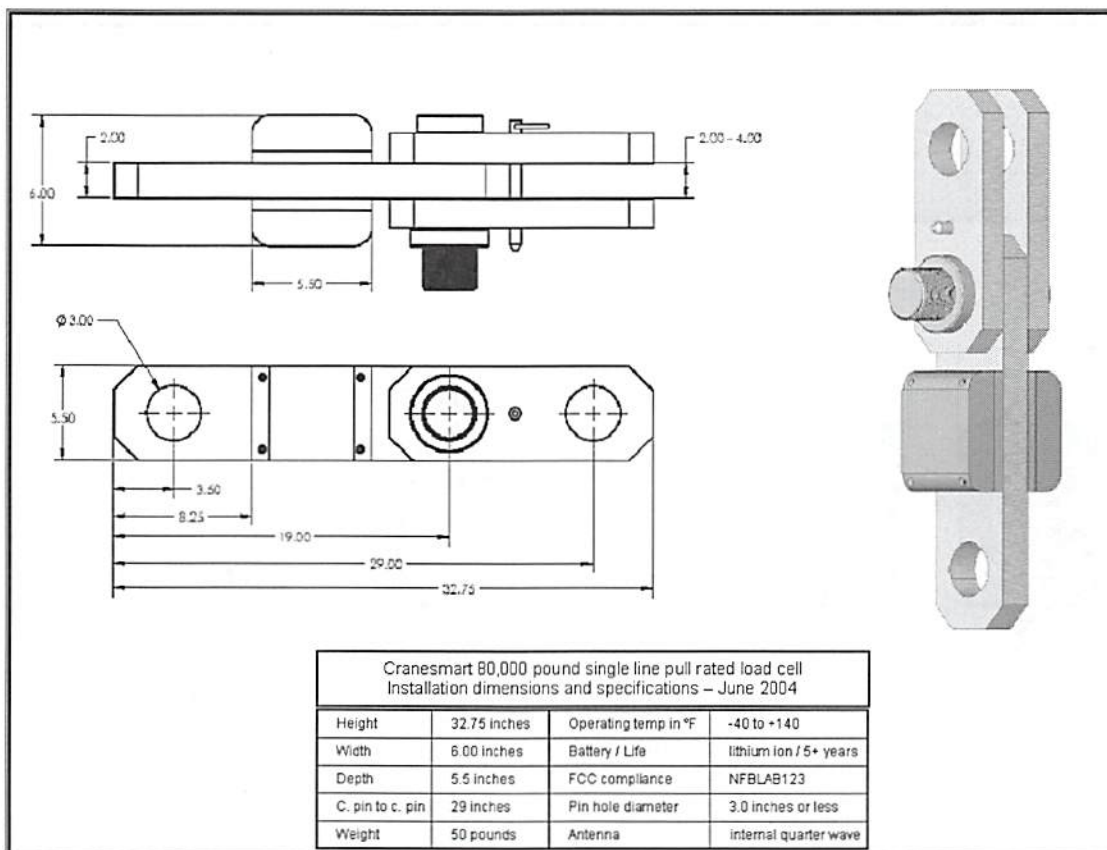
40,000lb single line pull load cell



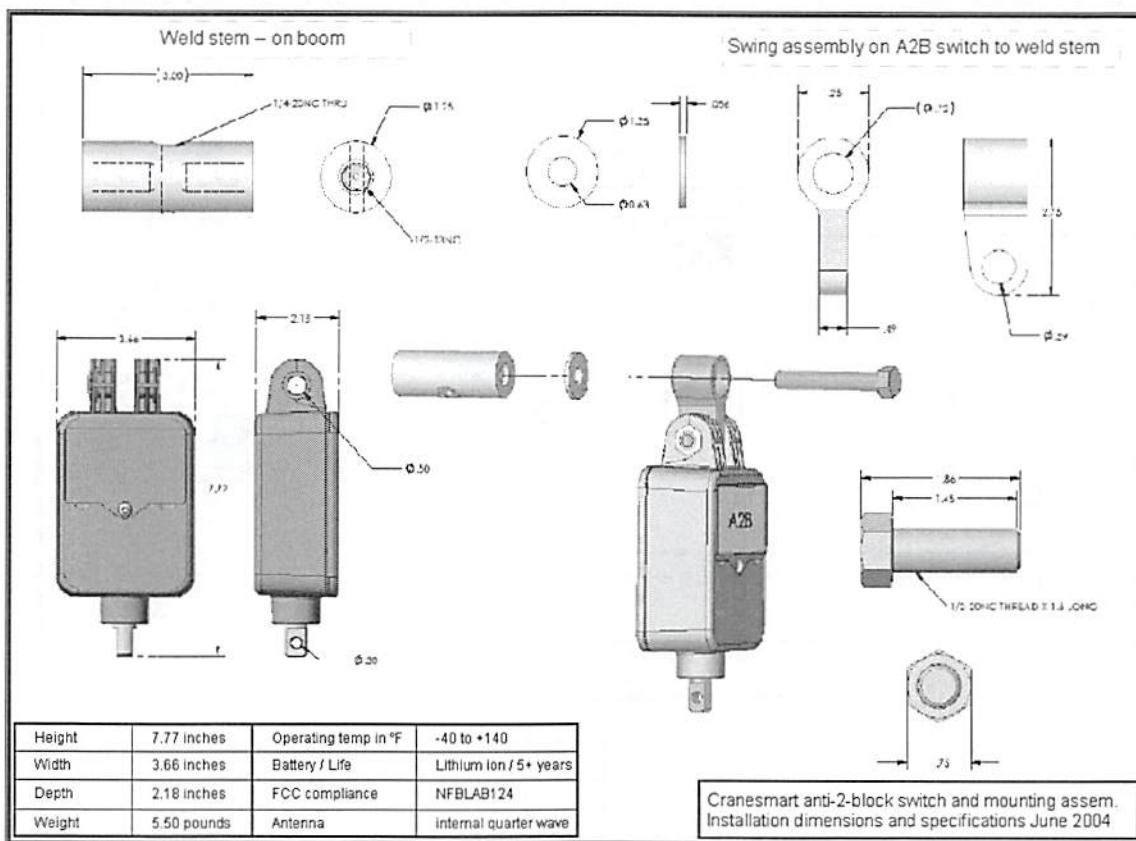
50,000lb single line pull load cell



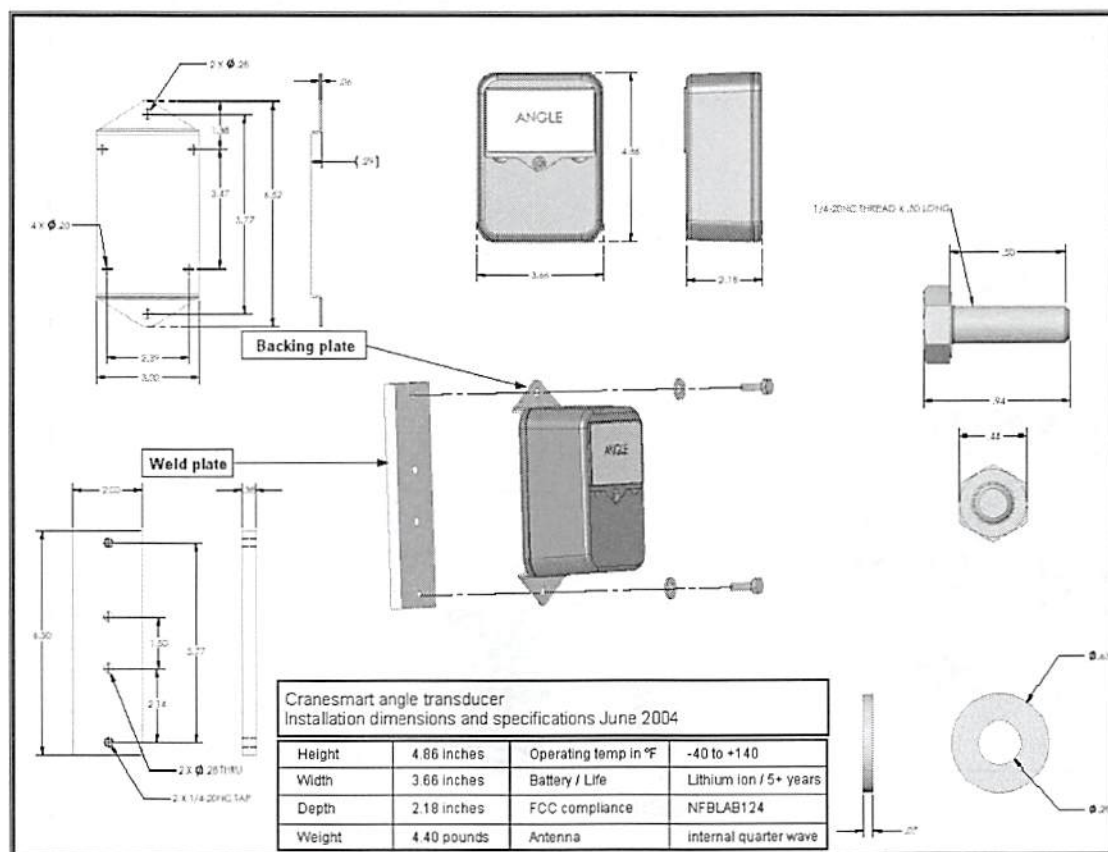
80,000lb single line pull load cell



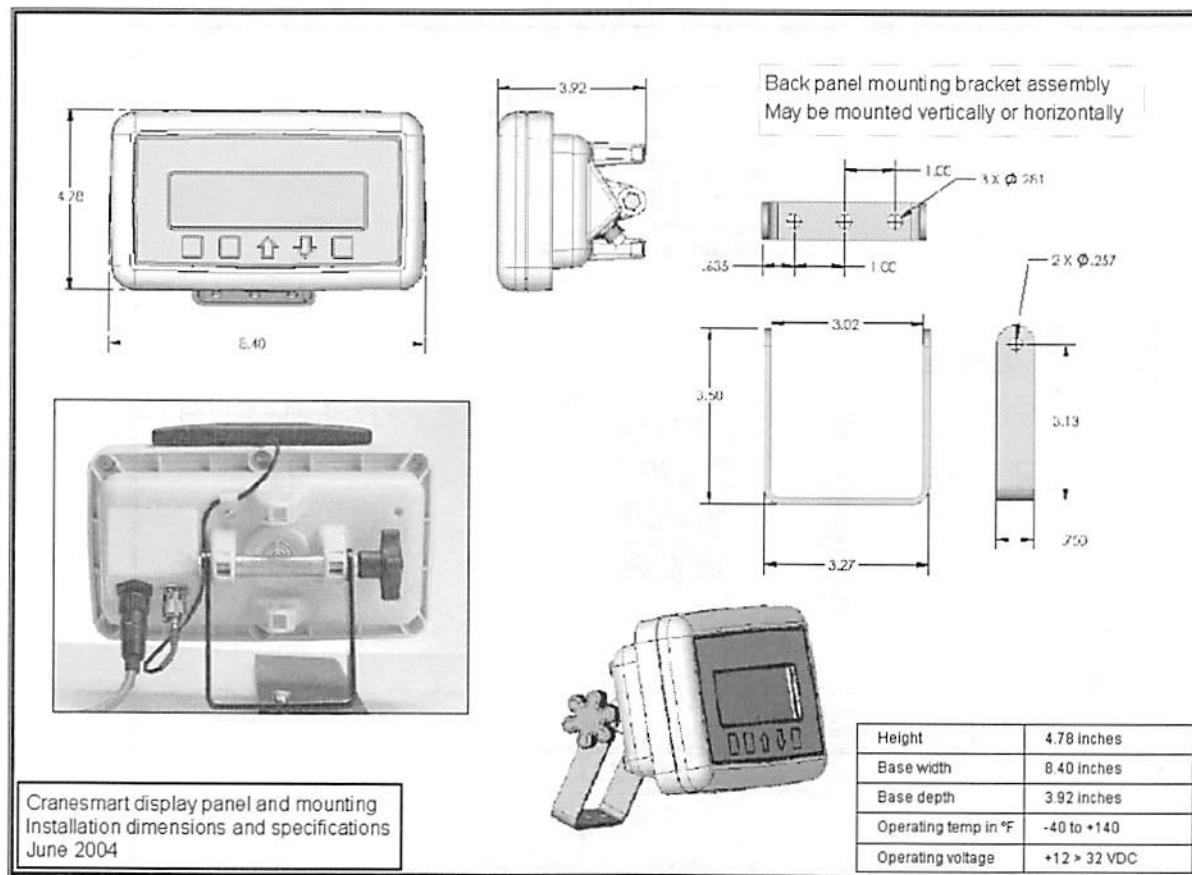
Anti-2-Block Switch



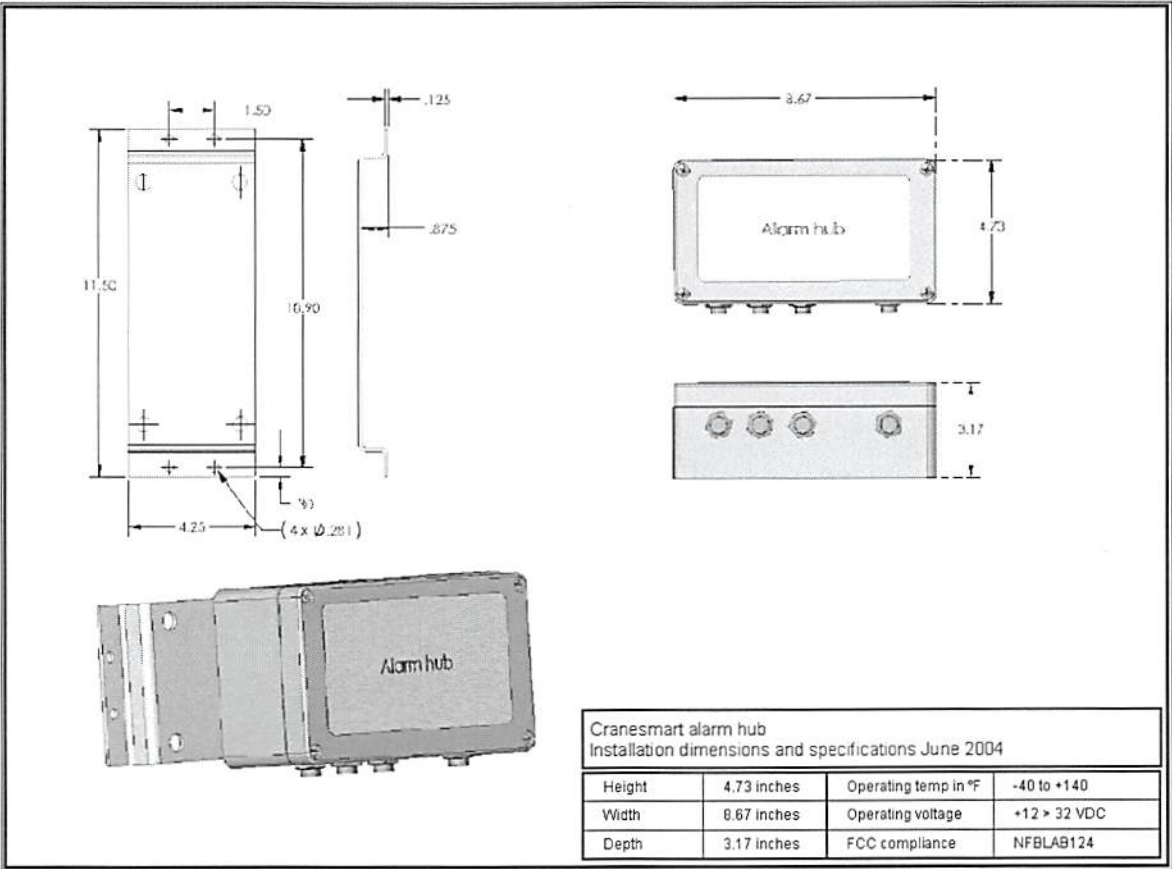
Boom Angle Transducer



Display Panel



Alarm Hub



Serial #: CS 08304

Innex Texas Company

Crane Smart System		Date: 2/05/09	Customer: CRAUSA	00000	Cranesmart America Inc.		Salesman: SB
New	Demo	Sale	5 Year	IS	Class I Div II	Add-on	Replacement
						Order #: 0010320A - 1	
CS NON-LMI		Cranesmart System			1	✓	
		40/25/JIB					

900-1035	Display Panel, 900MHz Xemics	1.00	✓	✓	
Type of Warranty	2-year Warranty	1.00	✓	✓	WARRANTY1
Panel Mounting Screws	Kit, Panel Mtg.Screw M&CS ONLY	1.00	✓	✓	999-3322
Output	Normally hot	1.00	✓	✓	110-0066
Power Cable	Cable, 20ft. Yellow Power	1.00	✓	✓	900-0221Y-20
Alarm Access in panel:	Alarm Access in panel enabled	1.00	✓	✓	110-1611
Antenna for receiver panel	Antenna Kit, 900MHz Marine	1.00	✓	✓	900-1607
Manual	CS 900MHz Universal Manual	1.00	✓	✓	MANUAL 4
Souvenir	Coffee Mug	2.00	✓	✓	P08

900-1115	40KW 900MHz Load Cell - Main	1.00	✓	✓	
Sand-Link	Sandwich Link, 24" Std SS	2.00	✓	✓	500-1007
Bushings for Sand Links	Bushing, 2 1/4 x 1 5/8 Female	2.00	✓	✓	800-5120
Sandwich Link Pin	1 5/8"40KW S.S. Pin -Long	1.00	✓	✓	810-0052
Washers	1 5/8" Plated Washer	4.00	✓	✓	810-0340
Cotter Pins	1/4"x 3" SS Cotter Pin	2.00	✓	✓	ENB-72
Stabilization Pin	Stabilizing Pin	1.00	✓	✓	ENB-38
Locking Threaded Center Pin	2 1/4" Threaded S.S. Pin	1.00	✓	✓	810-0200
Cotter Pins	3/8"x 3 1/2" SS Cotter Pin	2.00	✓	✓	ENB-79
Bushing for Male End	Bushing, 2 1/4 x 1 5/8 Male	1.00	✓	✓	800-5125


900-1112	25K 900MHz Load Cell - Aux 1	1.00	✓	✓	
Pins	1 5/8"Std S.S. Pin	1.00	✓	✓	810-0050
Washers	1 5/8" Plated Washer	4.00	✓	✓	810-0340
Cotter Pins	1/4"x 3" SS Cotter Pin	2.00	✓	✓	ENB-72

900-1040	A2B Switch, Main Line	1.00	✓	✓	
Weld Plate/Weld Bar	Install Kit, 900MHz A2B	1.00	✓	✓	900-1600
Counterweights	C-Weight Kit, Marine 5' Chain	1.00	✓	✓	939-09H
Cable Kits	Cable, A2B C-Weight Safety	1.00	✓	✓	900-0235

Serial #: CS08304

Crane Smart System		Date: 2/05/09	Customer: CRAUSA	00000	Cranesmart America Inc.	Salesman: SB
New	Demo	Sale	5 Year	IS	Class I Div II	Add-on
					Replacement	Order #: 0010320A - 2

900-1045	A2B Switch, Aux 1	1.00	✓	900-1600
Weld Plate/Weld Bar	Install Kit, 900MHz A2B	1.00	✓	939-09H
Counterweights	C-Weight Kit, Marine 5' Chain	1.00	✓	900-0235
Cable Kits	Cable, A2B C-Weight Safety	1.00	✓	


FEB 09 2009

Pre-shipping test completed (Initials:
Range Checked: Yes/No

2-10-09

Invoice #: _____ Required Ship Date: 2/10/09 Shipped By:  Shipped On: FEB 09 2009

Serial #: CSO 8304

Crane Smart System		Date: 2/05/09	Customer: CRAUSA	00000	Cranesmart America Inc.	Salesman: SB		
New	Demo	Sale	5 Year	IS	Class I Div II	Add-on	Replacement	Order #: 0010320A - 3
Compare Freq and ID's of Systems in use on attached page.								
Frequency of this system: 158								
ID for Load Main: 141								
ID for Load Aux 1: 142								
ID for Load Aux 2: 144								
ID for A2B Main: 145								
ID for A2B Aux 1: 145								
ID for A2B Aux 2: 145								
ID for Angle Main: 145								
ID for Angle Jib: 145								
Load Chart information complete and attached:								
Is this an LMI System:								
Crane:								
MV:								
LCD Display:								
Details and Special Instructions or Requirements:								
PO# P9122AW								
Linkbelt 238A								
Attn: Super John								

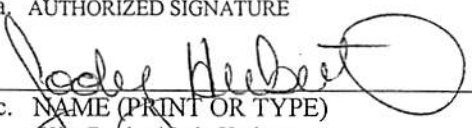
JD BK-14

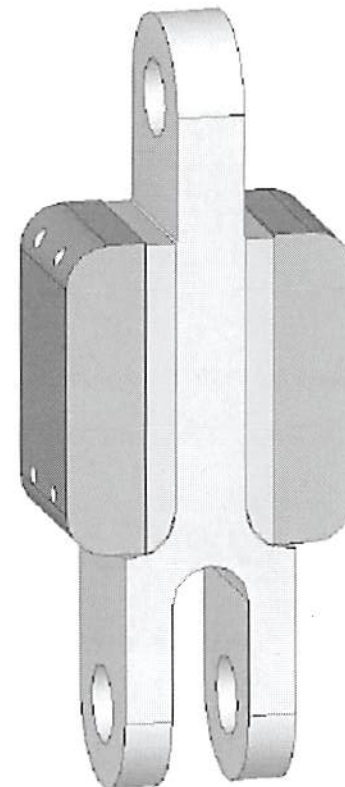
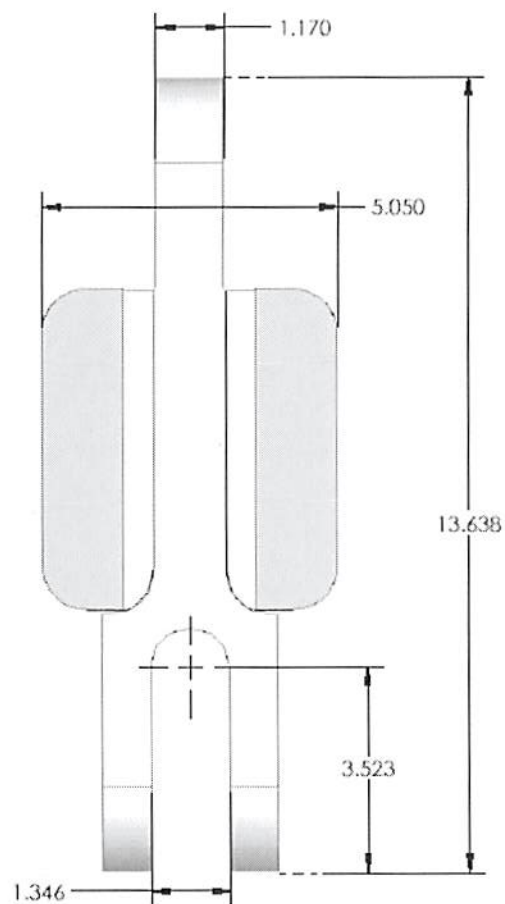
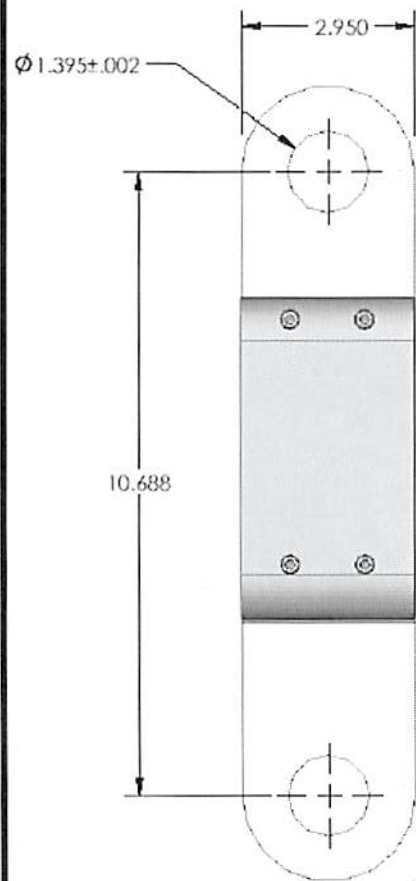
NORTH AMERICAN FREE TRADE AGREEMENT CERTIFICATE OF ORIGIN

EXPORTER NAME AND ADDRESS Cranesmart Systems 4908-97 Street Edmonton, Alberta T6E 5W2 Canada Tax Identification Number: 895847168 R.T.		BLANKET PERIOD (DD/MM/YY) FROM: January 1, 2009 TO: December 31, 2009			
1. PRODUCER NAME AND ADDRESS SAME AS ABOVE		2. IMPORTER NAME AND ADDRESS Inman Texas Company 8505 South Loop East Houston, TX 77017 Tax Identification Number 74-2068484			
5. DESCRIPTION OF GOODS	6. HS TARIFF CLASSIFICATION NUMBER	7. PREFERENCE CRITERION	8. PRODUCER	9. NET COST	10. COUNTRY OF ORIGIN
One (1) Cranesmart System	9031.80	B	YES	NO	CANADA

I CERTIFY THAT:

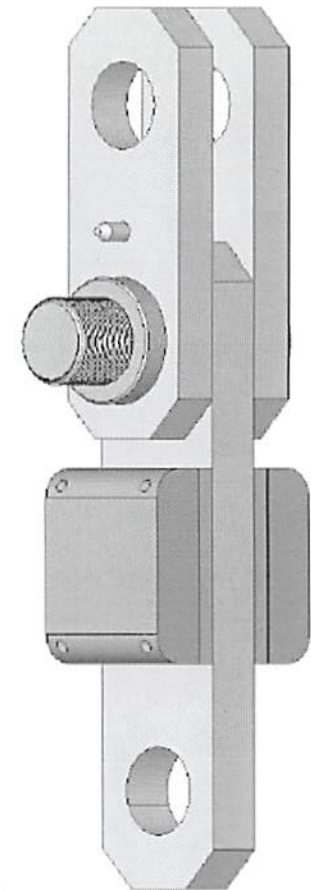
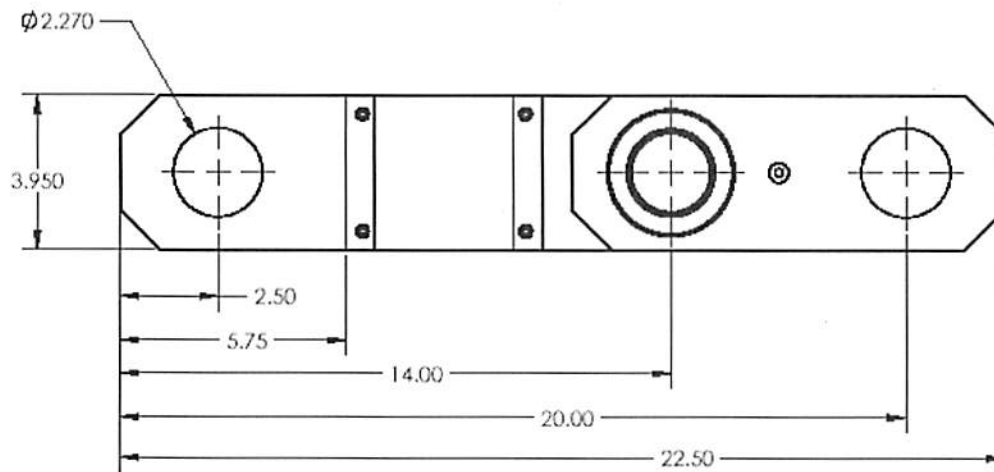
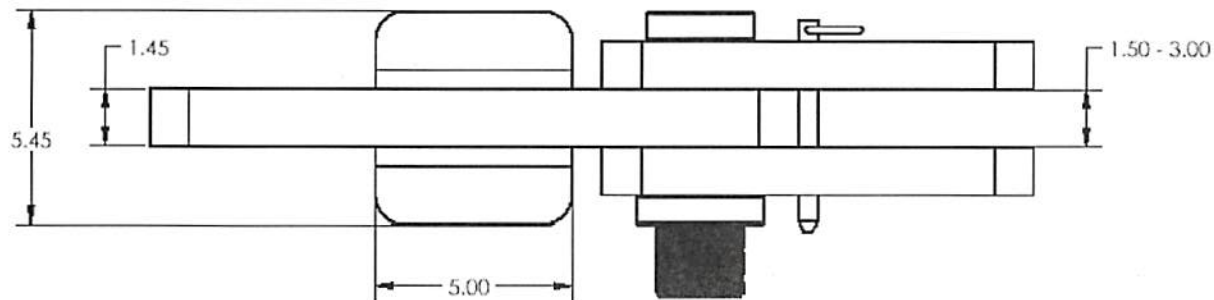
- THE INFORMATION ON THIS DOCUMENT IS TRUE AND ACCURATE AND I ASSUME THE RESPONSIBILITY FOR PROVING SUCH REPRESENTATIONS. I UNDERSTAND THAT I AM LIABLE FOR ANY FALSE STATEMENTS OR MATERIAL OMISSIONS MADE ON OR IN CONNECTION WITH THIS DOCUMENT;
- I AGREE TO MAINTAIN, AND PRESENT UPON REQUEST, DOCUMENTATION NECESSARY TO SUPPORT THIS CERTIFICATE, AND TO INFORM, IN WRITING, ALL PERSONS TO WHOM THE CERTIFICATE WAS GIVEN OF ANY CHANGES THAT COULD AFFECT THE ACCURACY OR VALIDITY OF THIS CERTIFICATE;
- THE GOODS ORIGINATED IN THE TERRITORY OF ONE OR MORE OF THE PARTIES, AND COMPLY WITH THE ORIGIN REQUIREMENTS SPECIFIED FOR THOSE GOODS IN THE NORTH AMERICAN FREE TRADE AGREEMENT, AND UNLESS SPECIFICALLY EXEMPTED IN ARTICLE 411 OR ANNEX 401, THERE HAS BEEN NO FURTHER PRODUCTION OR ANY OTHER OPERATION OUTSIDE THE TERRITORIES OF THE PARTIES, AND
- THIS CERTIFICATE CONSISTS OF ONE PAGE, INCLUDING ALL ATTACHMENTS.

11a. AUTHORIZED SIGNATURE 		11b. COMPANY CRANESMART SYSTEMS.	
11c. NAME (PRINT OR TYPE) Kim Rapley/ Jody Herbert		11d. TITLE Admin. Coordinator	
11e. DATE (DD/MM/YY) February 09, 2009	11f. TELEPHONE NUMBER 780-437-2986	FACSIMILE 780-438-9491	



Cranesmart 15,000 and 25,000 pound single line pull rated load cells
Installation dimensions and specifications – June 2004

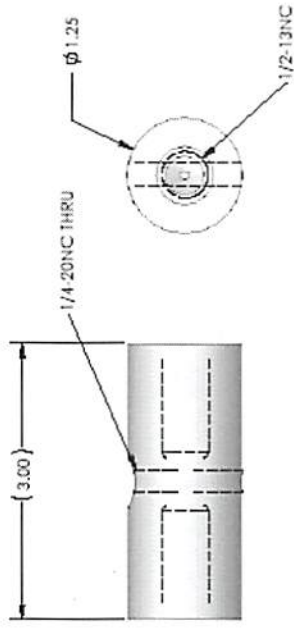
Height	13.63 inches	Operating temp in °F	-40 to +140
Width	5.05 inches	Battery / Life	lithium ion / 5+ years
Depth	2.95 inches	FCC compliance	NFBLAB123
C. pin to c. pin	10.68 inches	Pin hole diameter	1.62 inches or less
Weight	14 pounds	Antenna	internal quarter wave



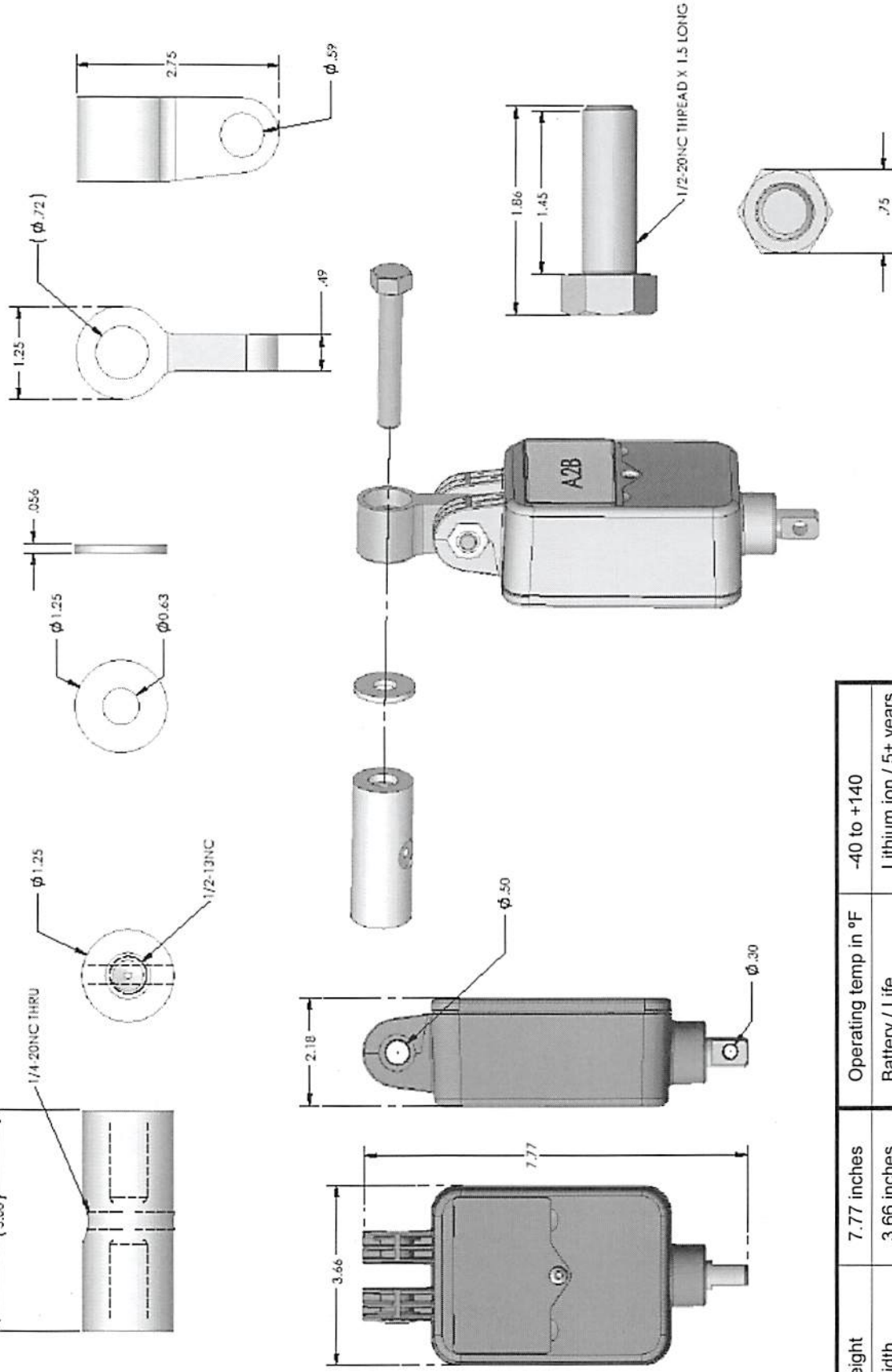
Cranesmart 40,000 pound single line pull rated load cell
Installation dimensions and specifications - June 2004

Height w/ links	22.50 inches	Operating temp in °F	-40 to +140
Width	5.45 inches	Battery / Life	lithium ion / 5+ years
Depth	3.95 inches	FCC compliance	NFBLAB123
C. pin to c. pin	20.00 inches	Pin hole diameter	2.270 or less
Weight	33 pounds	Antenna	internal quarter wave

Weld stem – on boom



Swing assembly on A2B switch to weld stem



Height	7.77 inches	Operating temp in °F	-40 to +140
Width	3.66 inches	Battery / Life	Lithium ion / 5+ years
Depth	2.18 inches	FCC compliance	NFBLAB124
Weight	5.50 pounds	Antenna	internal quarter wave

Cranesmart anti-2-block switch and mounting assem.
Installation dimensions and specifications June 2004

**Cranesmart Systems Inc. (The Load & A-2-B Company Inc.) & Governing Bodies:
Meeting or exceeding industry standards
900 Mhz System**

American Bureau of Shipping, American Petroleum Institute, Det Norske Veritas:

- Pages 2-5 - ABS, API, DNV Regulation Research

Detonator Research:

- Page 6 - Detonator Research
- Page 7 - 17 - Final Report: Safety Evaluation of RF Transmitters - Franklin Applied Physics
- Page 19 - 20 - Letter of Finding - Xploross Inc.
- Page 21 - Explosive Safety Bulletin - Halliburton Energy Services

Hazardous Area Approval:

- Page 22- CSA Certification
- Page 23 & 24 - CSA Certificate of Compliance
- Page 25 - Letter of Finding – Entela
- Page 26 – Letter of Finding – Entela
- Page 27 – Letter of Finding – Entela

NOTICE: The material contained within this document is proprietary to The Load & A-2-B Company Inc., and may not be reproduced or distributed in whole or in part or used for any purpose, other than for evaluation by approved sources, without prior written consent of The Load & A-2-B Company Inc.

Cranesmart Systems Inc. & Governing Bodies: Meeting or exceeding industry standards

Cranesmart Systems crane safety equipment meets or exceeds all safety regulations, and continually researches new information and standards set forth by pertinent governing bodies.

Critical Component Safety Factors:

API:

- The American Petroleum Institute (API) (2C, appendix A, section 2.43,) defines a "critical component" as "any component of the crane assembly devoid of redundancy and/or auxiliary restraining devices whose failure would result in an uncontrolled descent of the load or uncontrolled rotation of the upper structure."

ABS:

- In section 2.7 of the American Bureau of Shipping (ABS) Guidelines, table 2.4 states that load hoist rigging will have a safety factor greater than 5 to 1.

DNV:

- In section 5, B400 of Det Norske Veritas (DNV) Rules for Certification of Lifting Appliances 1994, outline a safety factor of 5 to 1 for all wire rope.
- In section 6, table B2 of the DNV, a safety factor of 2 to 1 is recommended for chains, shackles, hooks, swivels, etc.

Load & A-2-B's load cell is pinned in line with the wire rope and has a safety factor of 7 to 1, exceeding the guidelines set forth by the ABS, API and DNV.

Traceability Systems:

API:

In 2C section 13.2 requires "Traceability of materials for critical components and parts shall be achieved through a systematic program of serialization and identification indexed to process, inspection and test records of controlled manufacturing procedures."

Our equipment has traceability systems as described.

Charpy Testing:

API:

API 2C Section 13.3 states that "All critical components of the crane shall exhibit Charpy impact energy values assuring the transition from brittle to ductile fracture is at least 6° Celsius below the lowest anticipated service temperature."

All of our load bearing components have been Charpy tested to below -40° Celsius.

Required Equipment - boom angle, load radius & Anti-two block devices:

API:

- Section 12.1a of API 2C states that "A boom hoist limiter or shutoff shall be provided to automatically stop the boom hoist when the boom reaches a pre-determined high angle."
- Section 12.1b: "Boom stops shall be provided to resist the boom falling backward in a high wind or sudden release of the load."
- Section 12.1e: "A boom angle or load radius indicator readable from the operators station shall be provided."
- Section 12.1g: "A load indicating or a load moment device may be provided as optional equipment."
- In section 12.6 of API 2C, the following specifications are defined for anti-two block devices: "Means shall be provided to protect hoist ropes, structural components and machinery from damage which may occur when two sheave groups come into contact as the hoist cable is drawn in. A control override device or proximity warning device may be used. Stalling of the hoist drum is acceptable where damage or loss of control would not result."

ABS:

- Section 2.15.2 of ABS indicates that "A load moment indicator or load radius indicating device for main and auxiliary hoist is to be provided." And "An anti-two block system is to be provided to protect hoist ropes, structural components and machinery from damage."

DNV:

- In section 508 of DNV Rules for Certification of Lifting Appliances, 1994, Load indicator or load moment indicator giving continuous information is to be provided when the safe working load is 50 kN or greater, except for cranes where the allowed maximum rated load is constant. (ie, independent of load radius.) 50 kN = 11,240 lbs.

Cranesmart Systems crane safety equipment fulfils API and ABS's standards, offering a load moment indicator, load radius indicating device, an anti-two block system, which provides output for horns or shut-off devices that will protect hoist ropes, structural components and machinery from damage. For section 508 of DNV, the Cranesmart™ System gives a continuous display of safe working load, load on the hook, and load moment at all times during crane operation.

Alarm Warning Devices:

API:

- In section 12.8 d of the API, the following specifications are defined for Audible Warning Devices: "When specified by the purchaser, an audible signal device shall be provided. The control(s) for the device shall be within easy reach of the operator."

DNV:

- In section 5, ref. 507 of DNV's Rules for Certification of Lifting Appliances, 1994, "Offshore cranes are to be provided with an alarm, which automatically will be activated if the load exceeds the amount given in 507. (In response of the load being raised or lowered exceeds the predetermined amount which is not to be greater than the effect of a static load equal to the safe working load times, the dynamic factor for which the lifting appliance has been designed.) The alarm shall warn all personnel within the working area of the crane including personnel onboard an attending supply vessel."

- DNV also states that offshore cranes are to be provided with an audible and visual alarm system inside the operator's cabin or outside, in the case of a crane without operator's cabin. The alarm shall be activated when the load or overturning moment is 90% of the Safe Working Load (SWL) respectively 90% of the permitted moment from the SWL and any dead loads.

ABS:

- ABS section 2.15.2 indicates that: "An audible warning device, within easy reach of the operator is to be provided."

The Cranesmart™ System provides an audible and visual warning to the operator when the load reaches 90 % of the maximum rated capacity of the crane at that moment and at that capacity. It also provides an output from the panel that can be hooked up to an audible horn (we recommend auto adjustable) to warn all personnel.

Limit Switches:

DNV:

- Section 5, ref. 511 of DNV's Rules for Certification of Lifting Appliances, 1994, states that limit switches are to be positively activated and be of the failsafe type. Failsafe in this context means that the crane shall go to a defined safe condition in case of failure such as power failure, cable defect, etc.
- After a limit switch has been activated, a movement in the reverse direction shall not be prevented.
- Where more than one movement/operational mode will cause overtravel, all limit switches limiting such overtravel to occur shall be activated simultaneously (eg. hoist block overtravel at boom top may be caused either by hoisting or luffing.)

The Cranesmart™ System is failsafe. The outputs are normally hot, going cold in an alarm condition. This means that if there is a power failure, cable defect etc. that the crane will go to a safe condition. All radio transducers are self-checking and the panel alarms with a system malfunction. In the example of an impending two-block alarm, the hoist up and boom down functions are interrupted, while the hoist down and boom up functions are still active. All function shut down happens simultaneously.

Load Testing of Cranes:

API:

In appendix E of 2D, API states that a dynamometer can be used to load test cranes, but a load indicator should not be. API now recognizes and agrees that our load indicator can be used for load testing of cranes due to the fact that it is more accurate than the dynamometer due to design.

DNV:

Section 6, ref. B 202 states that "A mechanical or hydraulic precision dynamometer may be used; In the case of periodical re-testing of a lifting appliance where there is a lack of movable weights, In the case of a test following the repair or renewal of a part. The accuracy of the dynamometer should be within ± 2 per cent and the indicated load of such dynamometers under test load shall remain constant for approximately five minutes. "

Load & A-2-B load cells are accurate to ± 1 per cent, and are repeatable for up to three years at a time. This exceeds the above guideline and begs this question; What kind of

dynamometer were these people using that they had to lower the standard of repeatability to 5 minutes?

ABS:

Section 2.13 Existing Cranes states that "Existing cranes may be certified subject to satisfactory plan review, general examination, operational test including luffing, slewing, test of safety devices, and proof testing of the crane as a unit as required by 5.3, with the exception that a dynamometer or load cell may be used. The test should not be regarded as satisfactory unless the load indicator remains constant for a period of at least five minutes."

Summary:

Cranesmart Systems constantly monitors all regulatory bodies that are applicable to the crane, marine crane and construction industry. Equipment is regularly updated and expanded to reflect changes in safety requirements and legislation.

For clarification or additional information on any of the matter covered in this report, you may contact the following individuals/organizations:

- Tim Sampson, American Petroleum Institute (API,) Washington, D.C., VA
(202) 682-8153
- Anthony Dsouza, Det Norske Veritas (DNV,) Houston, TX
(281) 721-6600
- American Bureau of Shipping (ABS,) World Headquarters, Houston, TX
(281) 877-5800

For more information on Cranesmart Systems crane safety equipment, or any of the information contained in this report, you may contact:

- Mark Holt, General Manager,
4908-97 Street
Edmonton, AB T6E 5S1
Phone: (780) 437-2986
Fax: (780) 438-9491

Detonator Research:

The Cranesmart™ radio transmitters manufactured by Cranesmart Systems Inc., 4908-97 Street, Edmonton, AB, T6E 5S1, Canada. These devices radiate at 49.830-49.890 MHz. The output powers are 15.7 nanowatts for the load cell indicator and 2 microwatts for the anti-two blocking device.

The safety of electroexplosives in the vicinity of such low power transmitters specified above can be evaluated by using the following rule:

If the transmitter output power is lower than the no fire level for the electroexplosive device, then even if the coupling from the transmitter antenna to the electroexplosive is perfect, the electroexplosive is safe. We are assuming that the insulated electroexplosive wiring can be in actual contact with the transmitting antenna.

For reference purposes, the no-fire power of resistorized detonators is typically 2 watts, while the RED has a no-fire power of 5 watts. For conservatism with resistorized detonators, we assume that the protective resistors have failed (shorted), thus lowering the no-fire power to 40 milliwatts. Even at this level, there is considerable safety margin beyond the transmitter strengths of boom-proximity safety devices.

98 Highland Ave.
P.O. Box 313
Oaks, Pennsylvania
19456 U.S.A.

Tel. (610) 666-6645
Fax (610) 666-0173
FrankPhys@aol.com

FRANKLIN



APPLIED
PHYSICS

September 29, 2004

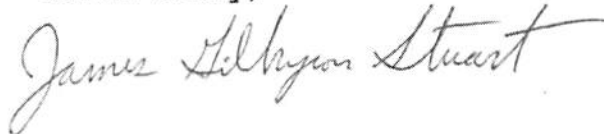
Mr. Jeff Crane
Load A2B Co.,
4908 -97 Inc.
Edmonton Street Canada
AB T6E 5W2

Ref: Purchase Order No. 003665 (Figure 7)
Franklin Project No. 20565
Safety Evaluation of RF Transmitters

Dear Mr. Crane,

We have completed this project. Here is our final report. We will return the equipment to you soon.

Yours truly,



James G. Stuart, Ph.D., President

1. Introduction

We undertook this study in order to establish whether it might be safe to use these small radio transmitters in close proximity to leadwires of electric blasting caps.

Load A2B Purchase Order Number 003665 covered this work. Figure 7 is a copy.

2. RF Hazard

Any radio frequency (RF) transmitter can induce electric currents to flow in nearby electric wires. In other words, the wires act like an antenna. If the RF transmitter is near the leadwires of an electric blasting cap, then current will flow through the bridgewire of the blasting cap. The question is whether enough current will flow to heat the bridgewire, and fire the cap.

3. Blasting Cap Sensitivity

Any type of blasting cap might be in use near these transmitters. As a worst case, we will assume that the nofire level of the blasting caps is 40 milliwatts. This is the lowest "safe" power level for any type of common blasting caps tested since 1960 at Franklin Applied Physics, Inc. This is a worst-case assumption because most blasting caps have a higher no-fire power level.

Sensitive blasting caps have a short thermal time-constant, at most a few milliseconds.

4. Loaned Material

Two cartons arrived at Franklin Applied Physics, Inc. on September 7, 2004. Shipping papers are in Section 13. Inside the cartons were three small radio transmitters, a read-out unit, and a battery cable. We show these in Figure 1.

Figure 1: Components



The read-out unit is marked "Cranesmart System." On the front of this read-out unit is a display screen and five buttons marked, respectively, Bypass, Select, Up, Down, and Accept. On the back of this read-out unit are mounting fixtures, a bracket, a socket for the battery cable, and a coaxial antenna jack.

We will call the three transmitters A, B and C. Figure 1 shows the transmitters thus marked.

A is a blue plastic box without markings. It is approximately 5 x 4 x 2 inches (12 x 9 x 5 cm) in size, weighing approximately 15 oz. (0.43 kg).

B is a blue plastic box with a mechanical connection at each end. It bears a tag marked "4142-5; Freq:0; ID:4; Tresh:704." The overall size is approximately 10 x 4 x 2

inches (24 x 9 x 5 cm), and it weighs approximately 1 lb. 15 oz. (0.88 kg).

C is approximately 14 x 5 x 3 inches (34 x 13 x 8 cm) and weighs approximately 14 lb. (6.4 kg). The metal has permanent markings: .XT-1391; 76."

5. Test Equipment

Technicians used the material and equipment listed in Table 1.

Table 1: Measurement Apparatus

Item	Manufacturer	I.D.
Receiver-Meter (Electronic Radiation Tester)	Alan Broadband Co. 93 Arch St. Redwood City, C 94062 U.S.A.	Zapchecker Model 180
Resistor, 2 ohms, 1/ watt, carbon film type		
DC supply	Hewlett-Packard model 6216A	sin 2016A- 18337
Digital recording oscilloscope	Tektronix model TDS 1002	SIN C038395
Simulated Blasting Cap. Calibrated 9/29/03.	Franklin Applied Physics, Inc.	F004
Volt-Ohm-Milliammeter (VOM) . Calibrated 9/12/04.	Triplett Corp	Model 310
Two length: of insulated hookup wire. The material is AWG 22 stranded copper Each length i approximately 6 feet (2 meters) long		

The simulated blasting cap F004 circuit diagram is Figure 2. Table 2 identifies the components. Figure 3 shows the calibration procedure. Figure 4 is a calibration sheet for F004. Table 3 is an analysis of the calibration data, and includes a graph.

10.

Figure 2: F004 Schematic Diagram

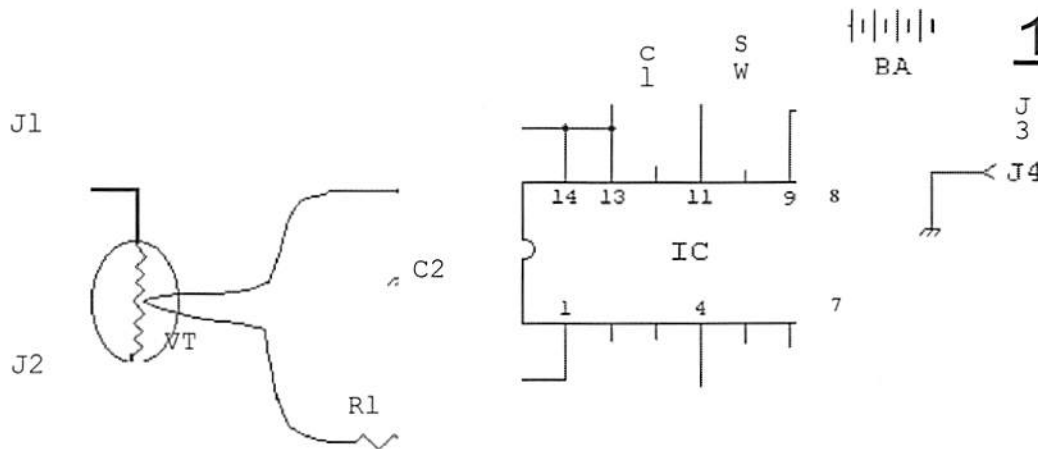


Table 2: F004 Parts

BA	Battery, 9- transistor type
C1	Capacitor, 100-pF disk ceramic.
C2	Capacitor, 100-pF disk ceramic.
IC	Integrated circuit, for thermocouple. Analog Devices AD594AQ, 8646-
J1	Binding post, red
J2	Binding post, black
J3	Tip jack, red
J4	Tip jack, black
R1	Resistor, 22K, 1/4-watt.
SW	Switch, toggle type
VT	Vacuum thermocouple (vacuo junction) . Heater insulated from thermocouple. Nominal current range 100 milliamperes. Maximum continuous current 150 mA. Nominal heater resistance 1.0 ohm UHF (Ultra-High-Frequency) type U.8. Thermocouple element ANSI type E. Purchased on Order No. 984, in September 2000, from: Best Technology Inc. , 400 Boren North, Seattle, Washington 98109.

Figure 3: F004 Calibration Procedure

STANDARD OPERATING PROCEDURE

5/02

CALIBRATION OF IQ VACUUM THERMOCOUPLE

Equipment:

- A HP 3438A DMM (milliamps)
- B Fluke 8840A DMM (DC millivolts)
- C Simpson 260 multimeter (millivolts)
- D Cal box - various resistors with 9V battery

Hook up battery in cal box. At each resistance value in turn, measure current (mA) and voltage (DC mV) input to the thermocouple, as well as output voltage (mV). Calculate input power ($I \times V$ in mW) and voltage difference (output voltage less output voltage for lowest resistance value on cal box, i.e. room temp.) for each set of data. Graph voltage difference vs. input power and determine slope of resulting (straight) line.

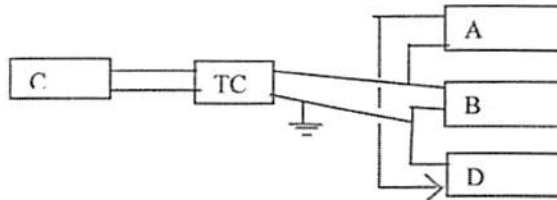
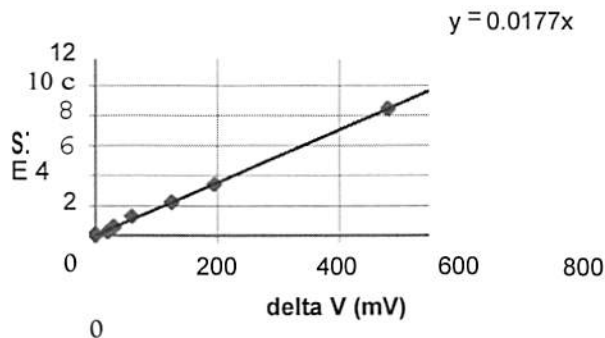


Table 3: F004 Calibration Analysis

mV out	mAin	mV in delta V (m'	mWin
300	3.8 6.7	3.46	0
300	10.1	6.23	0
300	16.6	9.36	0
320	24.8	15.44	20
330	36.9	23.05	30
360	48.9	34.47	60
425	60.5	45.67	125
495	94.9	56.57	195
780		89.04	480

calibration for F004 -- 9-29-03 2.5V
scale

6. Test Procedure

The equipment under test comprises three separate radio transmitters, which we call A, Band C.

At first, a technician used the receiver meter. His intent was to check transmitter operation. He brought the receiver meter close to each transmitter. He noticed that the RF power comes in pulses. The RF power is not constantly on." The RF power pulses are too brief to allow measurement of the RF power level.

As a way to determine the level of RF power transmitted, a technician set up an oscilloscope to monitor DC current that the transmitter draws from its battery.

He examined the battery from Transmitter A. It is a 3.6-volt lithium battery, SAFT type LS33600. It is the same size as a common flashlight battery.

A technician set up the circuit in Figure 5. He set the DC power supply to 3.6 volts. The 20-ohm resistor is R. The

voltage that appears across the oscilloscope is proportional to the DC current that the transmitter draws. The technician observed this current, for transmitter A. Then he replaced it with transmitter B, and subsequently with transmitter C. For each transmitter, he observed the DC current on the oscilloscope.

After this, technician used the simulated blasting cap, which contains a thermocouple. He simulated blasting wires near each transmitter. He attempted to measure radio frequency (RF) power pickup in these blasting wires. His purpose was to determine the maximum amount of radio frequency (RF) power pickup. He tried to simulate every configuration or way blasting wires could lie across a transmitter, or come into contact with a transmitter, or be coiled near a transmitter.

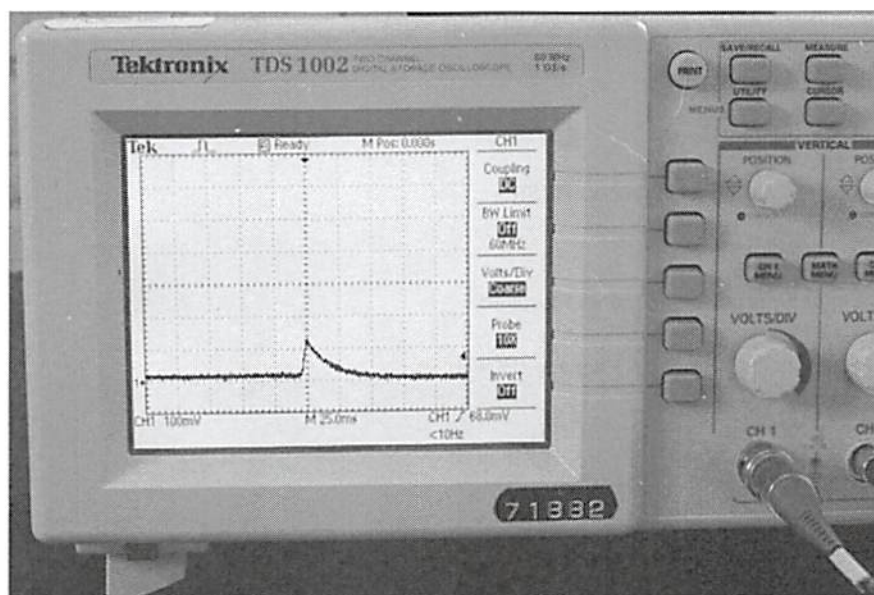
The technician connected the hookup wire to the input of the vacuum thermocouple. He connected the VOM to the output of the F004 transducer.

Watching the VOM, the technician brought the hookup wire near each transmitter, in every possible configuration. He looped the wire over it and near it. He tried to find a configuration that would produce observable RF power pickup.

7 . Results

For transmitter A, the technician observed a quiescent voltage of about 10 millivolts, on the oscilloscope. Every five seconds there was a pulse of voltage, to about 110 millivolts. The risetime was about 4 milliseconds. After rising quickly, the voltage decayed exponentially, with a time constant of about 21 milliseconds. Figure 6 shows this pulse.

Figure 6: Data on Oscilloscope



Transmitter B also has a 3.6-volt battery. A technician connected transmitter B as shown in Figure 5. It produced a voltage pulse on the oscilloscope just like the one from transmitter A. The interval between pulses was about 4 seconds.

Transmitter C also has a 3.6-volt battery. The technician connected transmitter C in the same fashion, and observed the same pulse. The interval between pulses was 5 to 6 seconds.

In disassembling transmitter C in order to perform this test, the technician noticed that the RF transmitter integrated circuit was a Texas Instruments model TRF6901. Table 4, from the Texas Instruments website, gives some specifications for this unit.

Table 4: Integrated Circuit Specifications

- Single-Chip RF Transceiver for 868-MHz and 915-MHz Industrial, Scientific, and Medical (ISM) Bands
- 1.8-V to 3.6-V Operation
- 860-MHz to 930-MHz Operation
- Low Power Consumption
- FSKjOOK Operation
- Integer-N Synthesizer With Fully Integrated Voltage Controlled Oscillator (VCO)
- On-Chip Reference Oscillator and Phase-Locked Loop (PLL)
- 8-dBm Typical Output Power
- Programmable Brownout Detector
- Linear Receive Strength Signal Indicator (RSSI)
- Flexible 3-Wire Serial Interface
- Minimal Number of External Components Required
- 48-Pin Low-Profile Plastic Quad Flat Package (PQFP)
Programmable XTAL Trimming

In using the simulated blasting cap F004, there was no observable indication of RF pickup power on the VOM.

8. Conclusions

We draw the same conclusions for all three transmitters:

The RF output from these transmitters is pulsed. The maximum voltage that we observed on the 20-ohm currentviewing resistor, during a pulse, was approximately 110 millivolts. Using Ohm's Law, we determine that the maximum current was 0.0055 ampere. The battery voltage is 3.6. Thus, the maximum DC power dissipation is 0.0198 watt, or 19.8 milliwatts. We do not know how efficiently the RF circuit generates RF power. Certainly the RF output power level must be less than the DC input power. Thus, we say that the RF power level is less than 19.8 milliwatts. This is much less than the no-fire level of the most sensitive blasting cap discussed in Section 3. This level of RF power pickup cannot fire a blasting cap.

According to Table 4, the RF output power from these transmitters is 8 dBm. That means that the ratio of the power output to a reference power level (1 milliwatt) is 8 decibels.

Equation 1: Decibels

Using Equation 1, we find that the specified output level is 6.3 milliwatts. This is much less than the no-fire level of the most sensitive blasting cap discussed in Section 3. This level of RF power pickup cannot fire a blasting cap.

When we used the simulated blasting cap F004, the change in VOM reading due to RF power pickup was less than the minimum detectable, i.e., 0.05 volt, or 50 millivolts. The calibration constant, from Table 3, is 0.0177 milliwatt per millivolt. Thus, the RF power pickup was less than 0.905 milliwatt. Under worst-case conditions, with the wires of the simulated blasting cap actually touching the transmitters, the RF power pickup was less than 0.905 milliwatt. This is much less than the no-fire level of the most sensitive blasting cap discussed in Section 3. This level of RF power pickup cannot fire a blasting cap.

9. Recommendation

It is not necessary to worry about these transmitters firing nearby electric blasting caps.

10. Malfunction Hazard

A malfunction in the transmitter circuit would not affect the conclusion of this report. Any malfunction could only decrease the transmitter RF power output, not increase it.

11. Limitation

The conclusions of this report apply only to the transmitters tested.



XPLOROSS INC.

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The Load & A-2-B Company Inc.
9411 - 63 Avenue
Edmonton, AB
T6E 0G2

March 22, 2000

Attention: Tom Bilodeau

Low Power Radio-Transmitter Safety Devices

This is in response to your query about the susceptibility of electric detonators to accidental initiation due to exposure to radiation from LOAD & A-2-B's load-control and boom-proximity safety devices for mobile cranes.

The Transmitters

The safety equipment in question is your model 737 and model 939 radio transmitters licensed by Industry Canada as "Low Power Transmitters". The RF Power Rating for these devices is 15.7 nanowatts (15.7×10^{-9} watts) and 2 microwatts (2×10^{-6} watts) respectively. Steve Williams of Industry Canada confirmed with me that these are the actual Effective Radiated Power (ERP) levels for these transmitters.

Conclusion

The ERP ratings for model 737 and model 939 transmitters are several orders of magnitude lower than the threshold level of 40 milliwatts which would have to be induced into the circuitry of an electric detonator for initiation to be possible. The frequency is not relevant in this case. The probability of initiating a detonator with these units at any distance is zero. In my opinion, these safety devices should be exempt from the Alberta Explosive Safety regulation which is designed to control standard radio transmission in the watts range.

Discussion

The most recent proposed change to the Alberta Explosives Safety Regulation, dated August 1999, is shown in Appendix I. This compares current legislation pertaining to radio transmitters (AR 272/76 s93), the proposed changes, and comments on the reasons for the changes. The lowest power level quoted is 0.1 watts for which the minimum

distance between transmitter and detonator is pegged at 10 metres. (This distance applies up to 5 watts). The highest level of radiation of LOAD & A-2-B's instruments is 2×10^{-6} watts. This is lower than 0.1 watt by a factor of 200,000! There is simply no mechanism by which even the most sensitive electric detonator could be initiated by this level of power.

Calculating a safe distance for a 2 microwatt transmitter is feasible but it would result in a value so small, the distance would effectively be zero.

The Alberta regulation is pertinent to standard fixed transmitters such as AM broadcast stations, and the new proposals will allow for mobile transmitters such as two-way radios and cellular telephones. The intention is to control the use of these common communications devices in the proximity of electric detonators. Applying even the minimum safety distance of 10 metres to microwatt transmitters would be excessive and completely unnecessary.

IME Publication #20

As discussed, I enclose a copy of publication #20 of the Institute of Makers of Explosives (IME) for your interest. This is the most authoritative safety guide for electric detonators near all types of radio transmitters worldwide. British Columbia has actually adopted IME #20 in its entirety, (BC OHS explosives regulation 296/97, part 21.61). This makes BC by far the most advanced province in this area.

Please do not hesitate to call if you have any questions on the above, or if you would like to involve me in discussions with Alberta. The explosives regulations fall under the auspices of Human Resources and Development, Workplace Health and Safety.

Yours truly,

Dr. Ian C. Ross
Xploross Inc.



Explosive Safety Bulletin



Volume II, Issue 2

June 2001

Generated by: James Barker, Tim Rayne, Richard Arsenault Approved by: Richard Arsenault	Distribution: <input checked="" type="checkbox"/> L&P <input checked="" type="checkbox"/> LWD <input checked="" type="checkbox"/> TT/TCP <input type="checkbox"/> PE/ZI <input checked="" type="checkbox"/> Other (list): P&M, IS, and Slickline	
Subject: Waiver for Boom Proximity Safety Devices (Load Cell) for Mobile Cranes During Explosive Operations		
For more information or answers to questions regarding this bulletin, contact:		
Richard Arsenault richard.arsenault@halliburton.com 281-871-4144	James Barker james.barker@halliburton.com 817-761-2210	Tim Rayne tim.rayne@halliburton.com 281-871-7294

Visit Our Web Site: <http://halworld.halnet.com/resafety>

Introduction: This Waiver allows for the Models 737 and 939 radio transmitters manufactured by The Load & A-B Company Inc., 9411-63 Avenue, Edmonton, AB, T6E 0G2, Canada to be used on a Mobile Crane during Explosive Operations.

Discussion: This waiver covers RF safety of the RED and conventional blasting caps in close proximity to certain boom-proximity safety devices (load cell) for mobile cranes.

The particular boom proximity devices are the Models 737 and 939 radio transmitters manufactured by The Load & A-B Company Inc., 9411-63 Avenue, Edmonton, AB, T6E 0G2, Canada. These devices radiate at 49.830-49.890 MHz. The output powers are — as described by the manufacturer — 15.7 nanowatts for the 737 model and 2 microwatts for the 939 model.

The safety of electroexplosives in the vicinity of such low power transmitters specified above can be evaluated by using the following rule:

If the transmitter output power is lower than the no fire level for the electroexplosive device, then even if the coupling from the transmitter antenna to the electroexplosive is perfect, the electroexplosive is safe. We are assuming that the insulated electroexplosive wiring can be in actual contact with the transmitting antenna.

For reference purposes, the no-fire power of resistorized detonators is typically 2 watts, while the RED has a no-fire power of 5 watts. For conservatism with resistorized detonators, we assume that the protective resistors have failed (shorted), thus lowering the no-fire power to 40 milliwatts. Even at this level, there is considerable safety margin beyond the transmitter strengths of boom-proximity safety devices.

How Does This Apply: This Explosive Usage Waiver applies to all explosive operations using Mobile Cranes that are using the Models 737 and 939 radio transmitters manufactured by The Load & A-B Company Inc.

References: The granting of this waiver is based on an Analysis Report "RF Safety Evaluation of Electroexplosives in Close Proximity to Low Power RF Transmitters Report Number P01036 (May 20, 2001) performed by Franklin Explosive Safety.

Halliburton Energy Services - Global Radiation & Explosive Safety Department

These bulletins are blind copied to you. In this way, people cannot respond back to everybody on the distribution list. These bulletins are suitable for HSE/Safety meetings and can be posted or distributed as needed.



January 3, 2003

The Load & A-2-B Company Inc.
4908 97 Street
Edmonton, Ab
T6E 5W2

Attention: Charlie Todd

Further to your request concerning information related to CSA Certifications to US requirements, please note:

1) CSA International is accredited as an NRTL (Nationally Recognized Testing Laboratory) by OSHA (Occupational Safety and Health Administration) of the US. This means that we can test and certify requirement to the US requirements, and our certification mark (with the US designator) has the same legal status as the UL In. mark in the US.

Attached are some advertising leaflets, which further explain our accreditation status and also the different CSA marks.

2) If the protection method is "intrinsically safe" the applicable US standard is ANSI/UL913. The requirements in the US standard are close to, but not the same as, the Canadian version CAN/CSA C22.2 No. 157. CSA is able to test and certify to the requirements of either one, or both, of these standards.

If further clarifications are required, please do not hesitate to contact us.

Best regards
CSA International

Lisa Ursu
Ph #(780) 490-2044
Fax# (780) 461-5322

1707-94 Street N.W., Edmonton, AB, Canada T6N 1E6
Telephone: 780.450.2111 1.800.463.6727 Fax: 780.461.5322 www.csa-international.org



Certificate of Compliance

Certificate: 1149552

Master Contract: 207162

Project: 1280042 (Edition 2)

Date Issued: January 10, 2002

Issued to: THE LOAD & A-2-B COMPANY INC.
9411 63 AVENUE
EDMONTON, AB T6E 0G2
CANADA

The products listed below are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US'



Issued by: Jay R McVeigh
Certification Specialist

Authorized by: John Verwey, P.Eng.
Operation Manager

CLASS

2258 03 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe and Non-Incendive Systems - For Hazardous Locations
2258 83 - PROCESS CONTROL EQUIPMENT - Intrinsically Safe and Non-Incendive Systems - For Hazardous Locations
- To U.S. Standards

PRODUCTS

Class I, Division I, Groups A, B, C and D

Model 365 Angle Transmitter or Model Crane Smart Angle Transmitter;
Model 777 Load Transmitter or Model Crane Smart Load Transmitter;
Model 959 Anti-Two-Block (A2B) Transmitters or Model Crane Smart A2B Transmitters;

Intrinsically Safe, Lithium Battery Powered; Temperature Code T4.

The 'C' and 'US' indicators adjacent to the CSA Mark signify that the product has been evaluated to the applicable CSA and ANSI/UL Standards, for use in Canada and the U.S., respectively. This 'US' indicator includes products eligible to bear the 'NRTL' indicator. NRTL, i.e. National Recognized Testing Laboratory, is a designation granted by the U.S. Occupational Safety and Health Administration (OSHA) to laboratories which have been recognised to perform certification to U.S. Standards.

DOC 507WD 2001-08-07



Certificate: 1149552
Project: 1280042

Master Contract: 207162
Date: January 10, 2002

APPLICABLE REQUIREMENTS

- CSA Standard C22.2 No 0-M1991 - General Requirements - Canadian Electrical Code Part II.
142-M1987 - Process Control Equipment.
157-M1992 - Intrinsically Safe and Non-Incendive Equipment for Use in Hazardous Locations.
UL 508, Seventeenth Edition - Industrial Control Equipment.
UL 913, Fifth Edition - Intrinsically Safe Apparatus and Associated Apparatus for use in Class I, II, III, Division I, Hazardous (Classified) Locations.



Supplement to Certificate of Compliance

Certificate: 1149552

Master Contract: 207162

*The products listed, including the latest revision described below,
are eligible to be marked in accordance with the referenced Certificate.*

Product Certification History

Project	Date	Description
1149552	January 25, 2001	Original Certification.
1280042	January 10, 2002	Update to add new model names Crane Smart Angle, Crane Smart Load and Crane Smart A2B.



Entela Western Regional Office
9410 - 95 Street
Edmonton, AB T6C 3X3
Canada

Letter of Finding

Issued To:

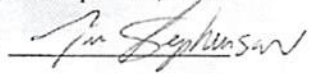
Date: November 6, 2002

The Load & A-2-B Company Inc.
9411-63rd Avenue
Edmonton, Alberta T6E 0G2
Canada

The following products are eligible to bear the field certification label as shown when following the requirements set out in report FC3109-13



Issued By: Bill Stephenson, C.E.T.

Signature: 

Product: models listed below:

Model Number	Rated Power
Crane Smart	Dry Contact Output 12VDC -10AMP

Certification : CLASS I, DIVISION 2, GROUPS C & D T6

Applicable Requirements:

UL Standards 1604, 508

CSA Standards C22.2 NO 213 -M1987 Non-Incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations
C22.2 NO 14



Entela Western Regional Office
9410 - 95 Street
Edmonton, AB T6C 3X3
Canada

Letter of Finding

Issued To:

Date: JULY 29 2004

The Load & A2B Company Inc
4908 - 97 Street, Edmonton, Alberta T6E 5W2

The following products are eligible to bear the field certification label as shown when following the requirements set out in report FC3109-33



Issued By: Bill Stephenson, C.E.T.

Signature: 

Product: Load, Angle, AND A2B, LINE RIDER, models listed below:

Model Number	Rated Power	
Load, Angle, AND A2B, LINE RIDER	3.6V, 500 uA	

Certification: Class 1 Div 1 T4 Group ABCD Exia IIC T4

Applicable Requirements:

UL 913, 508
CAN/CSA IEC 60079-11, 61010

ONLY VALID FOR PRODUCTS THAT HAVE BEEN/ARE MANUFACTURED AND LABELLED FROM THE DATE SHOWN ABOVE AND UP TILL 6 MONTHES LATER



Entela Western Regional Office
9410 - 95 Street
Edmonton, AB T6C 3X3
Canada

Letter of Finding

Issued To:

Date: June 17 2004

The Load & A28 Company Inc
4908-97 St.
Edmonton, Alberta
T6E 5W2

*The following products met the criteria in the applicable standards shown when
following the requirements set out in report Fc3109-29*



Issued By: Bill Stephenson, C.E.T.

Signature: 

Product: CraneSmart Display , models listed below:

Model Number	Rated Power	
CraneSmart Display	12/24 VDC 0.5A	

Evaluated as : Class I Div 2 CD, ExnA IIB T4

Applicable Requirements:

UL 1604, 508
CSA, IEC 60079-15, 61010

ONLY VALID FOR PRODUCTS THAT HAVE BEEN/ARE MANUFACTURED AND LABELLED FROM THE
DATE SHOWN ABOVE AND UP TILL 6 MONTHS LATER