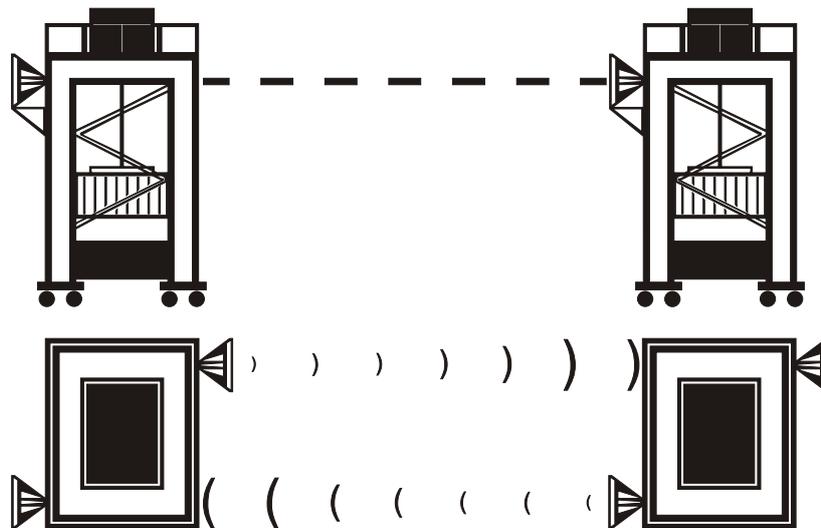


INSTRUCTION MANUAL

CraneSonic



CRANE-DISTANCE-WARNING-SYSTEM

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1. INTRODUCTION

1.1 About this Manual

This instruction manual provides information specific to the CraneSonic.

After reading this *Introduction* and completing the physical *Installation* first time system installers begin with the programming. Always begin with the *Quick Start Parameters*.

Introduction	introduces installers and operators to the CraneSonic with brief descriptions of key features
Installation	provides a step by step procedure to install and interconnect a CraneSonic system.
Programming	defines program mode display and keypad functions, and contains general programming information.
Quick Start Parameters	details the minimum recommended programming required to prepare the CraneSonic for RUN mode operation.
Operation	explains RUN mode display and keypad functions, including the RUN mode entry procedure and performance evaluation recommendations.
Application Parameters	details the programmable features which may be used to alter RUN mode display, failsafe, relay, and mA output operation..
Enhancement Param.	explains the programmable features used to enhance RUN mode operation. (Normally used for trouble shooting)..
Troubleshooting Guide	provides a quick reference to installation modification and programming remedies to overcome possible problems which could occur.
Specifications	lists the environmental, physical, and operational characteristics associated with the CraneSonic.
Programming Charts	provides a convenient space to record all programming for future reference.(A Crane application has already been stored)

1.2. About the CraneSonic

This microprocessor based device is designed specifically for distance measurement applications for fast marine port cranes as for example RTGC, OHBC and RMGC. The CraneSonic is designed to protect both directions.

The CraneSonic transmits electronic pulses to the ultrasonic transducer. The Transducer converts the electronic pulses to ultrasonic pulses which are emitted from the transducer face in a narrow beam. The CraneSonic measures the time from the pulse emission, to receiving the reflection (echo) from the next flat surface (crane bridge). Using the time measured, the CraneSonic calculates the distance from the transducer face to the flat surface.

The distance calculated is displayed on the Crystal Display (LCD). If the calculated distance is nearer than the programmed switch off parameter, the respective relays will set for slow down or stop.

Operator programming is accomplished using a infrared programmer and is stored in non-volatile memory, unaffected by power interruption. The infrared interface permits one programmer to be used for any number of CranSonic. Upon programming completion, the removable programmer may be locked away, thereby securing all programming.

2. INSTALLATION

2.1 Location

Inspect all potential mounting locations. It is recommended to observe the following points when selecting the location for the installation of the polycarbonat housing.

The ideal mounting location is where the.....

1. ambient temperature is between -20 and 50 °C (-5 to 122 °F).
2. the front cover has sufficient room to swing open.
3. operator and electronics are not exposed to the weather.
4. cable length requirements are minimal
5. mounting surface is free from vibration.

Avoid mounting locations where the CraneSonic is.....

1. exposed to direct sunlight. (Otherwise, provide a sun shield.)
2. close to high voltage or current runs, contactors, or SCR control drives.

2.2. Cable/Conduit entry Requirements

Before beginning the installation, specify the required cables, cable fittings and necessary accessories. The following cables will be required:

- Transducers	RG 62 A/U coax (or equivalent)
- Temperature sensor (if used)	LIYCY 2 x 0,75 mm ² (or equivalent)
- Power	H 07 RN-F 1,5 mm ² (or equivalent)
- Connection to PLC	H 07 RN-F 1,5 mm ² (or equivalent)

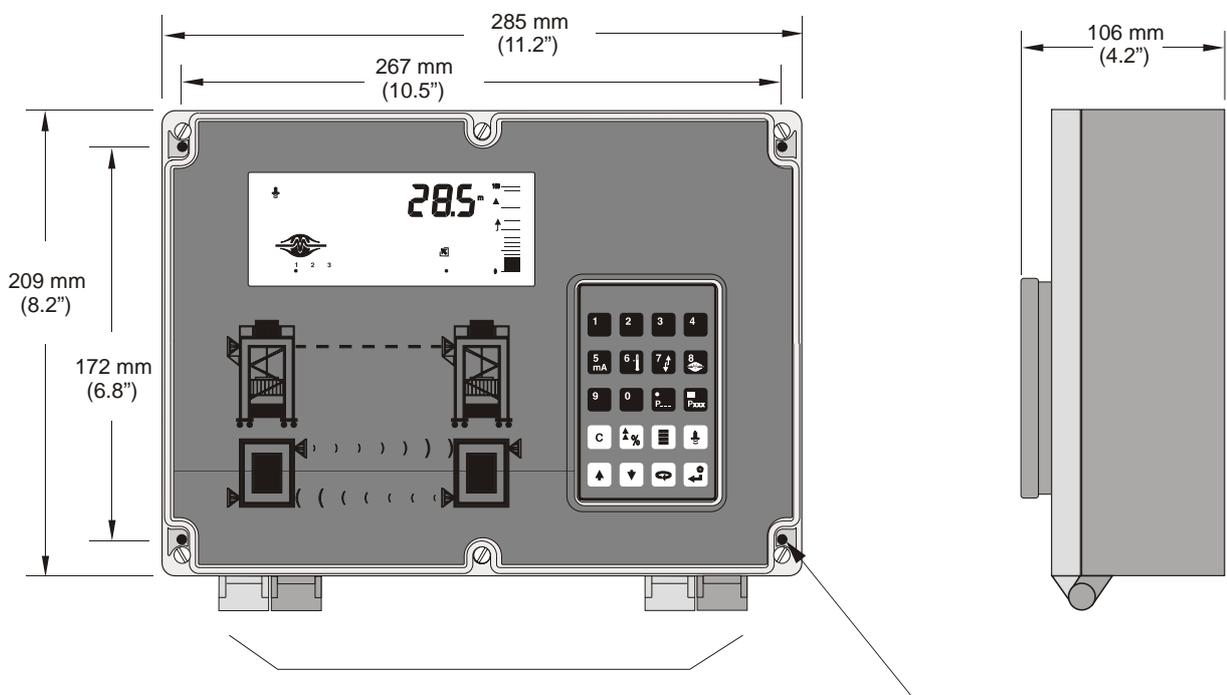
Please note:

Transducer cables must be run in a grounded metal conduit, separate from other wiring. All wiring must be performed in accordance with local governing regulations.

2.3 Mounting

Inspect all cartons and packaging for possible damage during shipment, before removing the CraneSonic and associated equipment.

1. Loosen the 6 enclosure lid (captivated) screws and swing the lid open.
2. Remove the 4 Board B mounting screws (outer corners) and remove the circuit board assembly. Use standard circuit handling care for contamination and static discharge prevention.
3. Drill sufficient holes in the enclosure bottom to meet enclosure cable/conduit entry requirements.
4. Attach the enclosure to the selected mounting surface. (4 predrilled screw holes provided.)
5. Attach the conduits/cable hubs to the enclosure. (do not apply undue force.)
6. Reinstall the circuit board assembly.



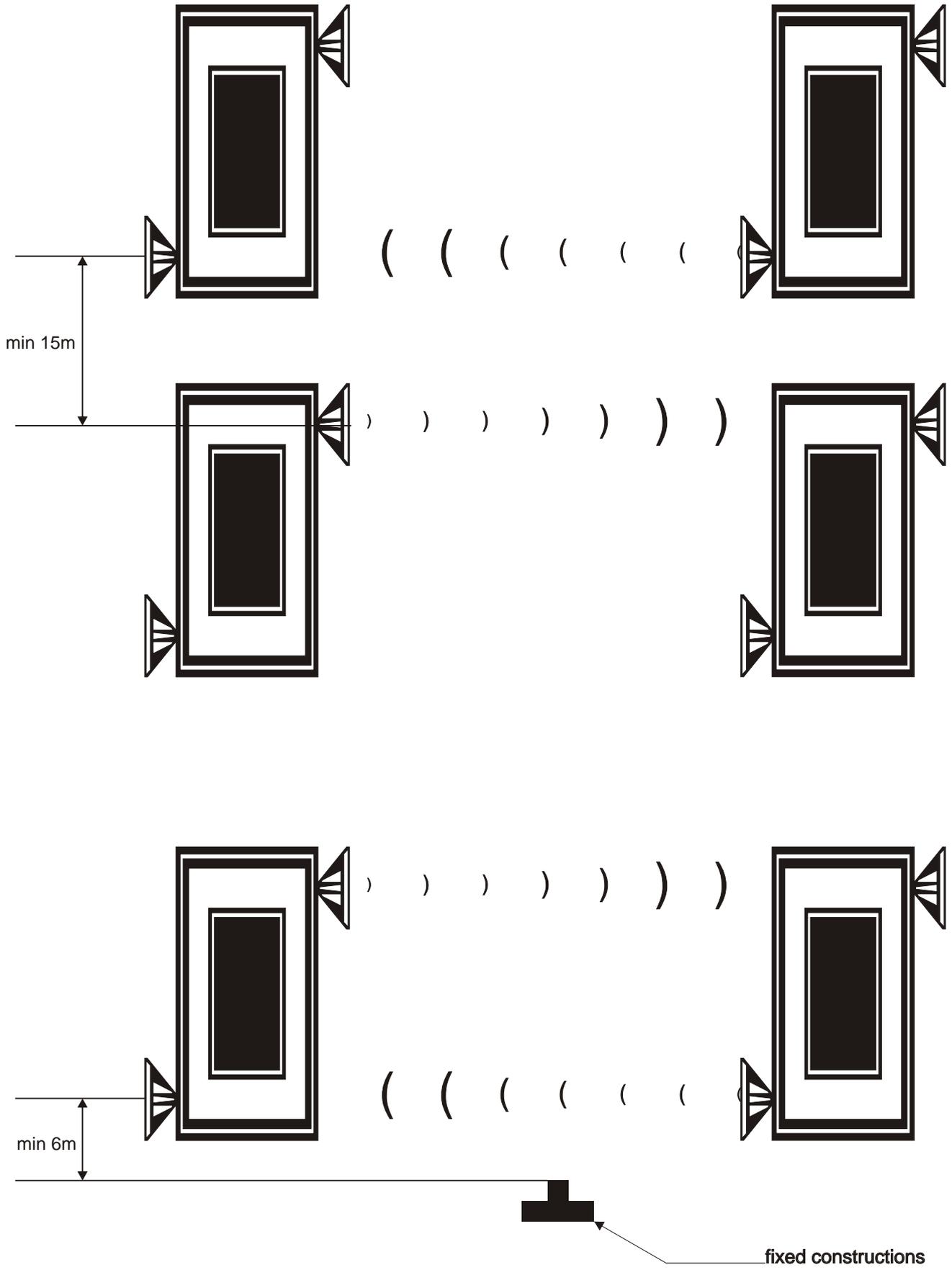
Suitable location for conduit entrances.
Use water tight conduit hubs to maintain the enclosure rating

Screw hole \varnothing 4,3mm (0,17")
access under lit (4 places)

2.4 Transducer Mounting

Objects near the transducers face cannot be reliably detected. Mount the transducers away from the nearest monitored objekt by the following distance.

T-60, nearest distance 1,2 m (4,33 ft)

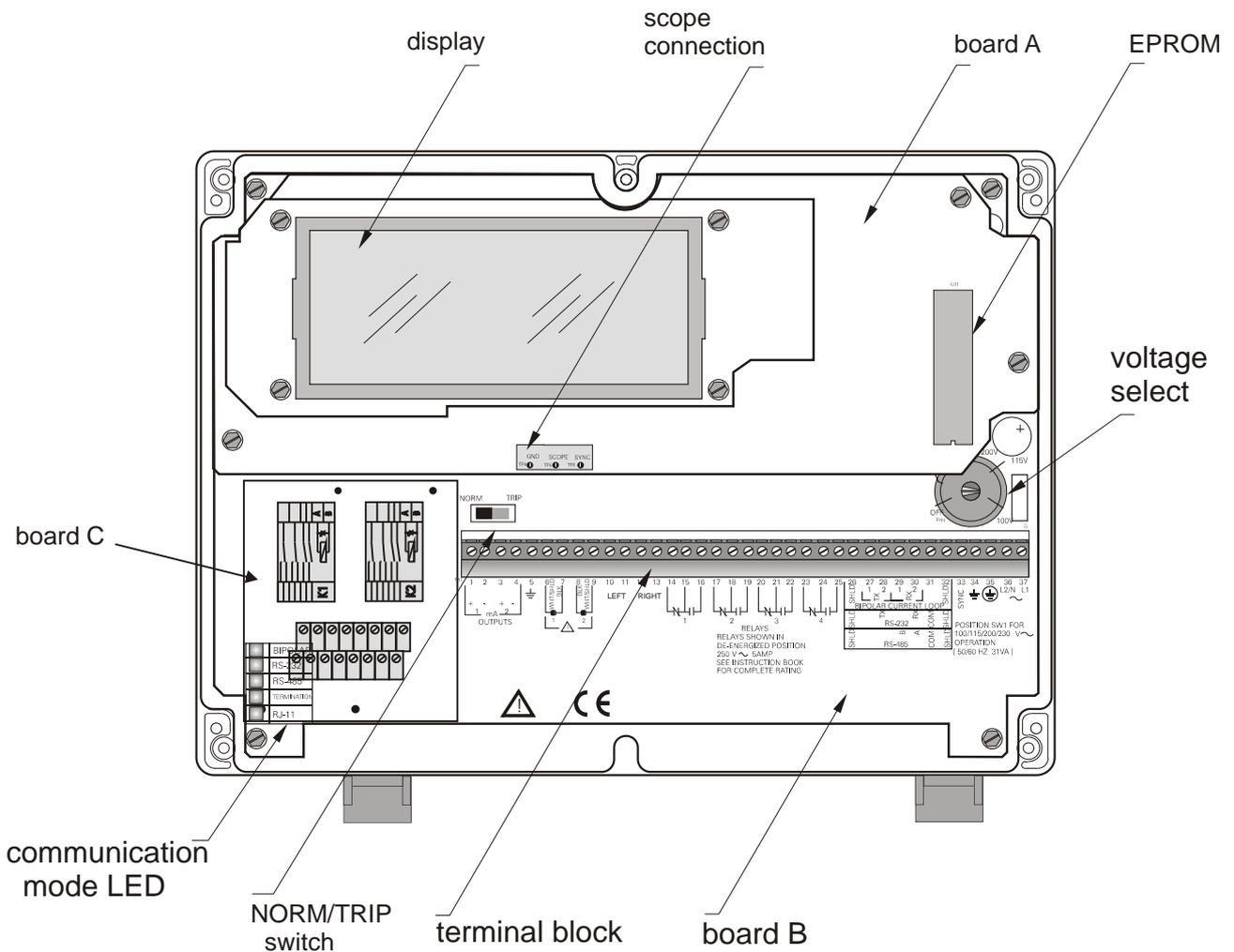


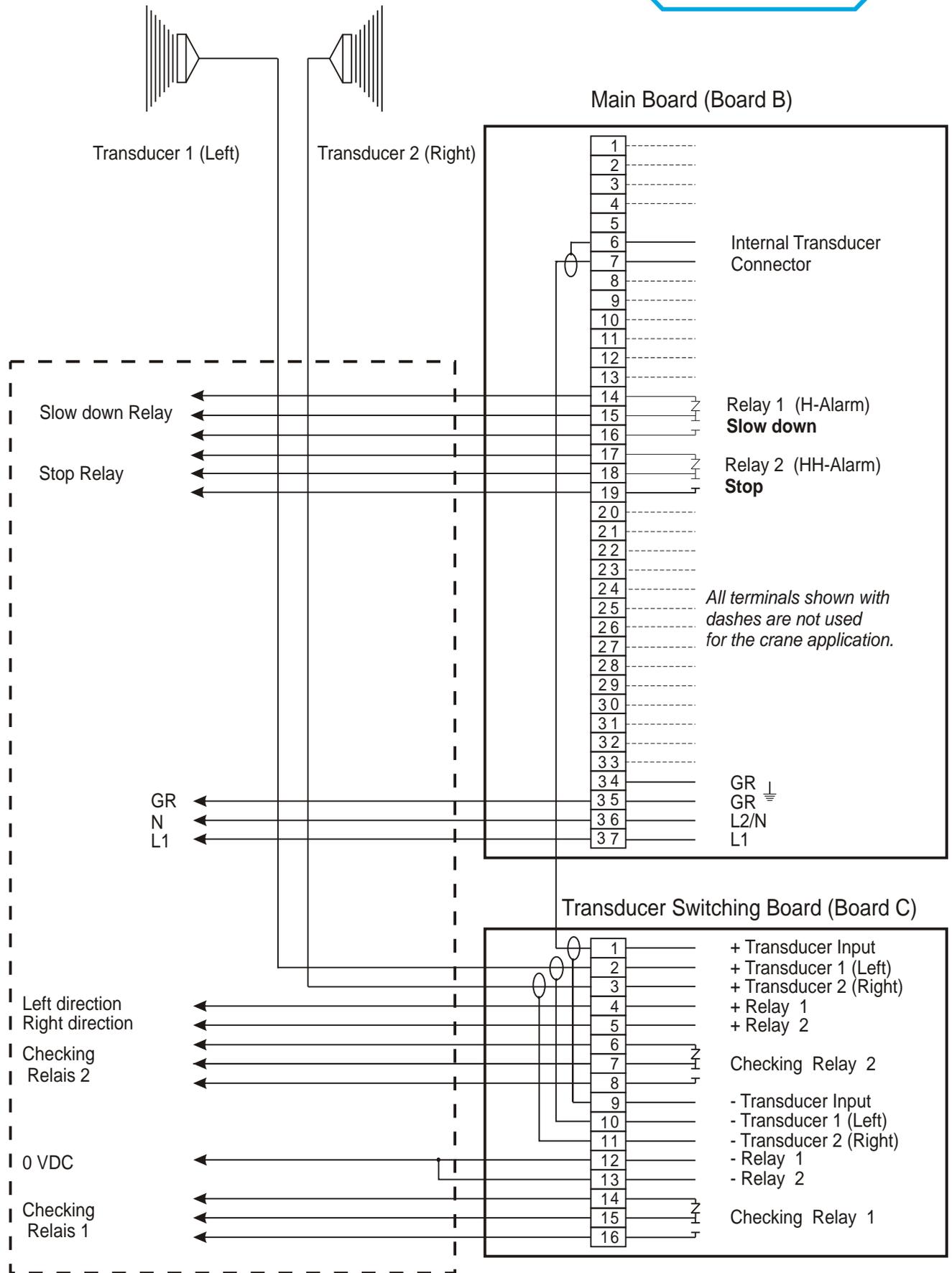
2.5 Interconnection

Before interconnecting system components to the CraneSonic terminals, verify that all components have been installed in accordance with the associated product instruction manuals.

Connect all associated equipment cable shields to the CraneSonic shield connections. to avoid differential ground potentials, do not connect cable shields to ground (earth) elsewhere. Insulate (tape) cable shields at all shield junctions to prevent ground loops..

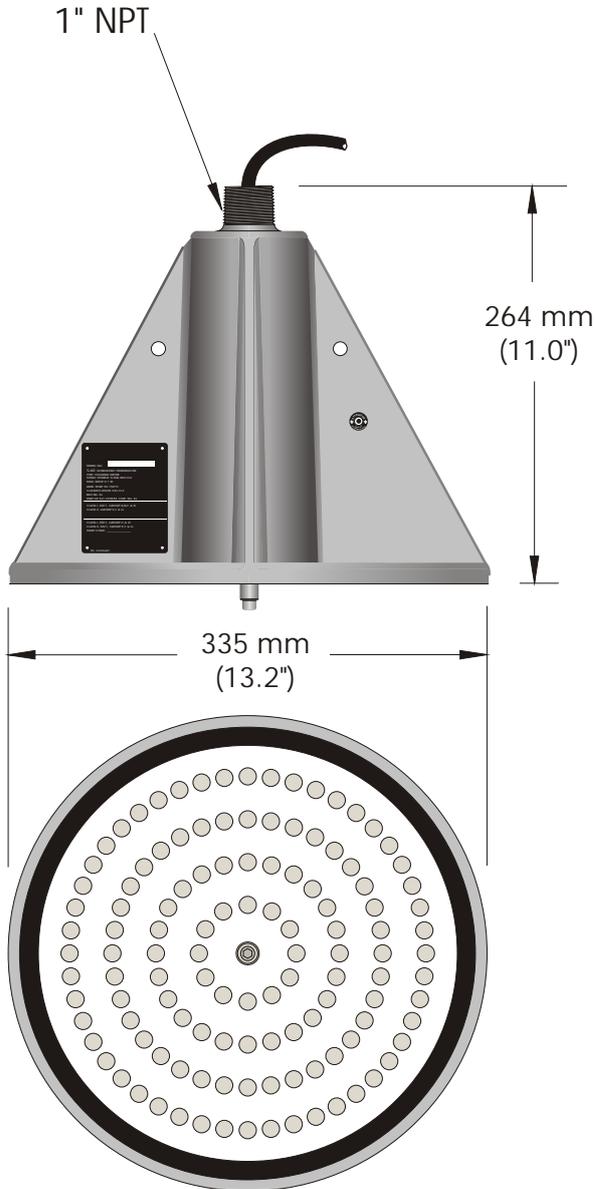
All wiring must be performed in accordance with local governing regulations.





The Switching Relays are electrically interlocked on the board

Customer Arrangement to PLC



Important:

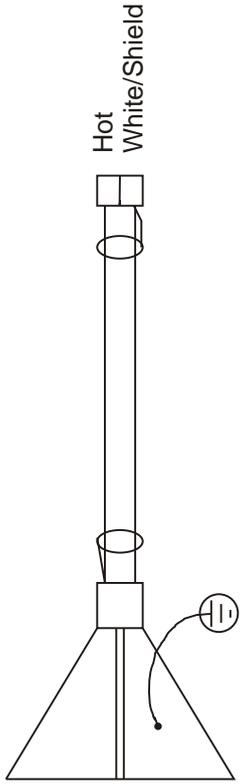
1. Max. cable length 350m
2. Beam Angle: 5,5°
To avoid false echoes, install the sensor such that the sound path will not intersect with crane constructions.
3. Should be mounted to run parallel to the face and reflex face
4. Hitting, rubbing or hurting the face break the Sensor.
5. Sensor cable should be run in a grounded metal conduit, separat from all other cabling.

Sensor material:

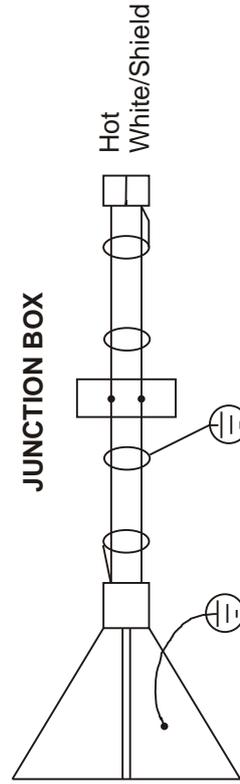
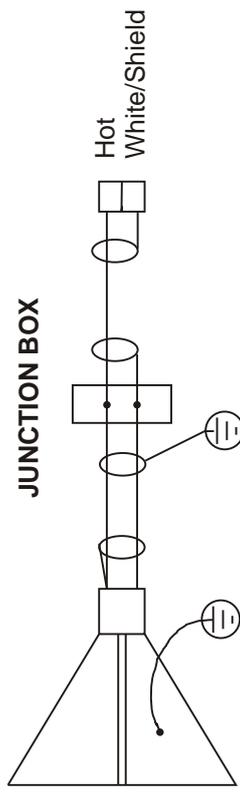
- Housing : aluminium
 Enclosure : CSA enclosure 4 (similar to NEMA 4) IP65
 Weight : 6,6 kg

	Datum		2.5.6.		
	Bearb.		T-60 Transducer	CraneSonic	Bl. 12
	Gepr.				50 Bl.

2 Conductor Twisted with Shield



Co-axial Cable



It is required that the transducer be connected to ground via external cable to ground lug provided and the installation be done in accordance with local covering regulations.



Änderung	Datum	Name	Datum	System: CraneSonic		2.5.7. Transducer-Wiring	Bl. 13
							50
							Bl.

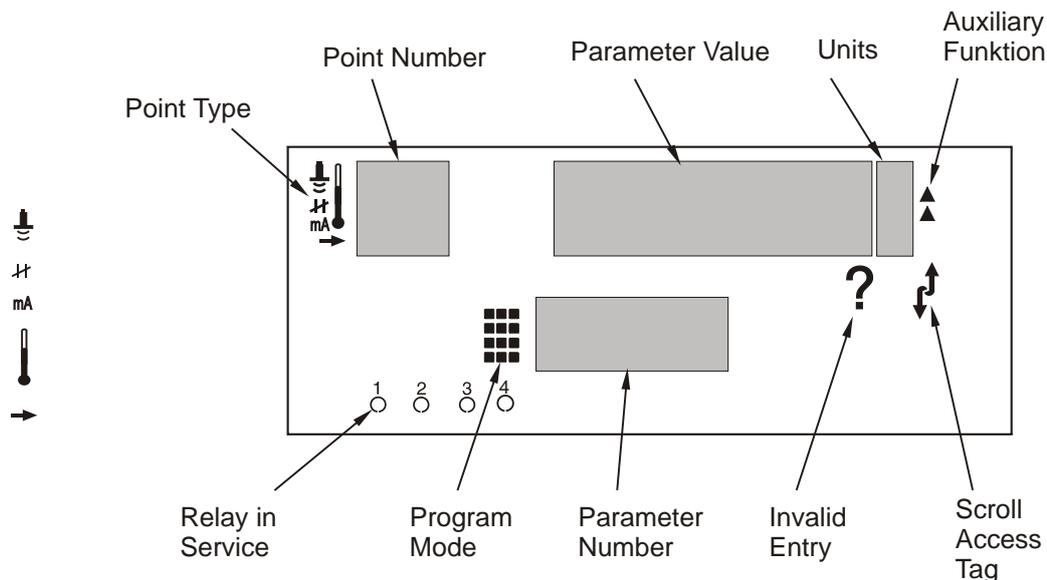
3. PROGRAMMING

Operator programmable features are identified by a Point Number and Parameter Number. Parameter Numbers have a preset Parameter Value for each Point Number.

Programming is accomplished by altering the preset Parameter Values as required to obtain the RUN mode operation desired. All operator programmable features are defined in the Quick Start Parameters, Application Parameters, and Enhancement Parameters sections of this instruction manual.

3.1. Display

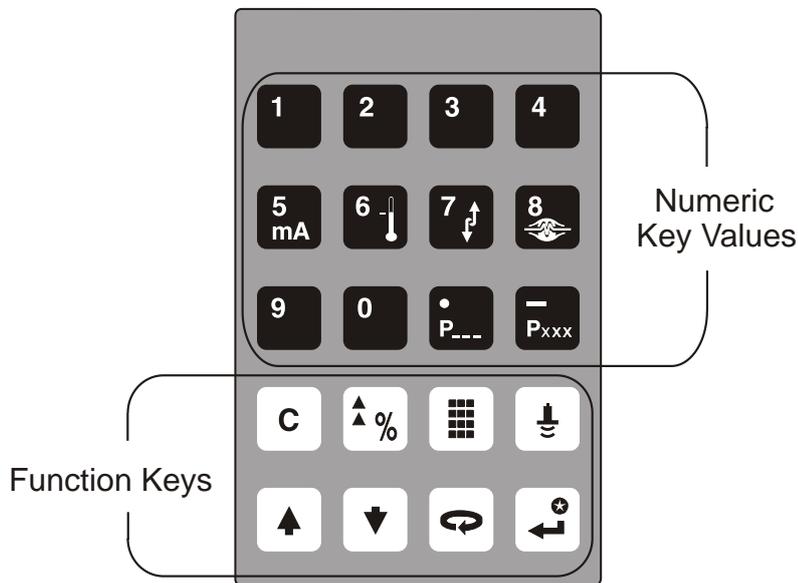
In the program mode, the Point Type, Point Number, and Parameter Value (as well as a variety of other programming information) may be viewed. Note that many indicators are specific to certain programming conditions and therefore, **all indicators are not displayed at any time.**



Parameter Number	the programmable feature the Parameter Value pertains to.
Point Type	the Point Number refers to a Transducer, Relay or mA-Output
Point Number	the Transducer, Relay or mA-Output # the Parameter Value pertains to.
Parameter Value	the current value of the Parameter Number for the Point Number displayed.
Percent	indicates the Parameter Value is displayed in percent.
Invalid Entry	indicates the value entered is questionable (are you sure?).
Auxiliary Function	indicates Auxiliary Function access (only some Parameter).
Scroll Access Tag	indicates the Parameter Value may be scroll accessed.
Programm Mode	indicates the program mode is activated.

3.2 KEYPAD

In the program mode, use the programmer keys to perform the identified functions.



shift access to Point Number, Parameter Number, or Parameter Value display.



input the numeric value into the accessed display.



input a Parameter Value decimal Point (moves Profile and TVT Pointers left).



input a negative Parameter Value (moves Profile and TVT Pointers left).



delete the current Parameter Value display (initiate a parameter reset).



store the current Parameter Value in memory (complete a parameter reset).



switch the Parameter Value to % or Units (access Auxiliary Parameter Function).



increase the accessed display value.



decrease the accessed display value.



take an ultrasonic measurement.



enter the RUN mode.

3.3. Program Mode Entry

Upon initial power application, the CraneSonic displays "OFF".
To enter the program mode.....

1. place the infrared programmer in the enclosure lid recess (no wiring or fastening required).

press  and 

- 2.

When the program mode is entered after RUN mode operation, all operating data is retained in memory. Relay status and mA output values are "held" at "last known" values

(unless affected by a parameter alteration or  is pressed) until the RUN mode is re-entered. The RUN mode is automatically re-entered if the CraneSonic is left unattended in the program mode for an extended period.

3.4. Parameter Value Alteration

In the programm mode....

1. press  as required to underline the Parameter Number display field and...

a) key in the desired Parameter Number, (direct access) or....

b) press  or  as required (scroll access).

(As preset, Quick Start Parameters, and previously altered parameters may be scroll accessed).

2. press  as required to underline the Point Number display field and...

a) key in the desired Point Number, (direct access) or....

b) press  or  as required (scroll access).

To alter the Parameter Value for all Point Numbers once, select Point Number 00.

3. With the desired Parameter Number and Point Number displayed....

key in the desired Parameter Value and press 

If Parameter Value alteration is not permitted, access the Lock Parameter (P000) and enter the security code (See Programming Security).

3.5. Parameter Reset Features

On initial power up, all parameters are at "original" values. In many cases, when a Parameter Value is altered, associated Parameter Values are automatically altered accordingly, When a Parameter Number is accessed, if the Parameter Value displayed acceptable, no entry is required.

To return an operator adjusted Parameter Value to the preset value, with the appropriate Point Number and Parameter Number displayed....

press  and 

Perform a Master Reset (P999) if the CraneSonic was "bench tested" using arbitrary parameter Values before system installation, following an Eprom replacement, or whenever complete reprogramming is required.

3.6. Special Parameters

Some Parameter Values are for display purpose only and cannot be operator altered. These are referred to as **view only parameters**. In the parameter sections of this manual, View only parameters are identified by a "V" beside the Parameter Number.

Some Parameter Values must be common for all Point Numbers. These are referred to as **global parameters**. When a globalparameter is accessed, the Point Number display automatically switches to Point Number 00, and returns to the Point Number previously selected when a non-global Parameter is accessed. In the Parameter sections of this manual, global parameters are identified by a "G" beside the Parameter Number.

3.7. Programming Security

All operator programming is retained in non-volatile memory, immune to power interruptions. When programming is complete, the programmer may be removed and locked away to prevent inadvertent programming alteration. As well the Lock parameter (P000) may be used.

3.7.1. Security Parameter

P 000 (G) Lock

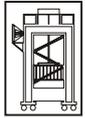
Use this feature (if desired) to secure all programming from inadvertent alteration. Direct access this parameter after all programming is complete and enter any value (other than 1954) to activate the programming Lock. When Lock is activated, the CraneSonic may be switched from the RUN mode to the program mode and the value of any parameter may be viewed but not altered. To unlock, direct access this parameter and enter the value "1954" and confirm.

This parameter cannot be reset by pressing  

values: 1954 = off (Parameter Value alteration permitted)
 other = activated (programming secured)

3.9. CraneSonic Parameters

Not all parameters in the sections of this manual are relevant to the crane application. The different parameters will be signified by additional symbols which have the following meanings:



1. important for the crane application



2. may be used if necessary



3. not relevant for the crane application

4. QUICK START PARAMETERS

Alter the Quick Start Parameters as required to suit installation requirements.

4.1 P001 Operation



Enter the type of RUN mode operation desired.
Selection:

- 0 = out-of-service
- 1 = level
- 2 = space
- 3 = distance
- 4 = difference
- 5 = average
- 8 = tripper

Input: 3 = distance

4.2 P002 Material



Enter the type of material to be monitored.
Selection:

- 1 = flat surface
- 2 = solid

Input: 1 = flat surface

4.3 P003 Measurement Response



Enter how quickly the CraneSonic is to respond to changing measurement.
Selection:

- 1 = slow
- 2 = medium
- 3 = fast
- 4 = surge
- 5 = turbo

Input: 5 = turbo



4.4 P004 Transducer

Enter the type of transducer connected to the CraneSonic for the Point Number displayed. Selection:

Ultrasonic

Ultrasonic/Temperature

0 = not entered
 1 = T..
 2 = T..
 3 = T..
 4 = R..
 5 = R-13

100 = St..
 101 = C..
 102 = C..
 103 = C..
 104 = P..
 105 = P..

106 = S/T..
 107 = S/T..
 110 = T-60
 109 = S/T..
 110 = S-60



Input: 110 = S-60/T60



4.5 P005 Units (G)

Enter the units of measurement desired for programming Empty (P006) and Span (P007).

Possible values:

1 = metres (m)
 2 = centimetres (cm)
 3 = millimetres (mm)

4 = feet (ft)
 5 = inches (in)

Input: 1 = metres



4.6 P006 Empty

Enter the maximum distance (transducer face to the desired distance) to be measured, in Units. This value is preset to 8.000 m (or equivalent Units programmed). The value entered automatically sets Span (P007) to the maximum recommended value.

Possible values:

0,000 to 9999

Input: 60



4.7 P007 Span

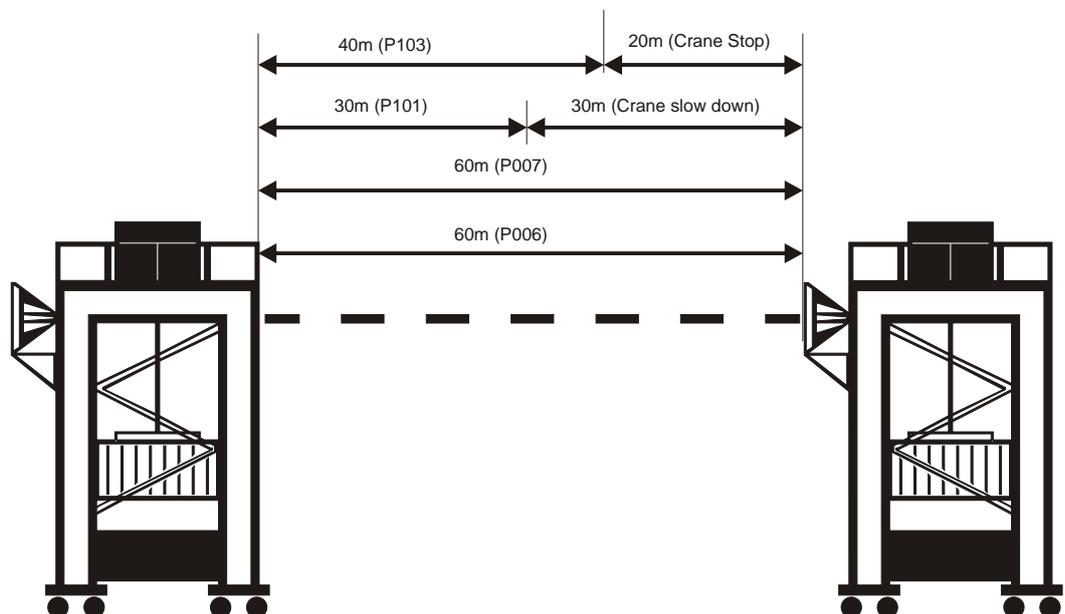
Span (the distance between transducer face and the maximum distance) is preset to the maximum recommended value for the Transducer (P004) and Empty (P006) value entered. When "distance" operation (P003 =3) is selected, Span is preset to the Empty distance.

(see example)

Possible value:

0,000 to 9999

Input: 60



The initial adjustment of the unit is complete when the Quick Start Parameters have been entered. The basic function of the unit can now be tested by calling up the OPERATION MODE. If necessary, the parameters can be finely adjusted.

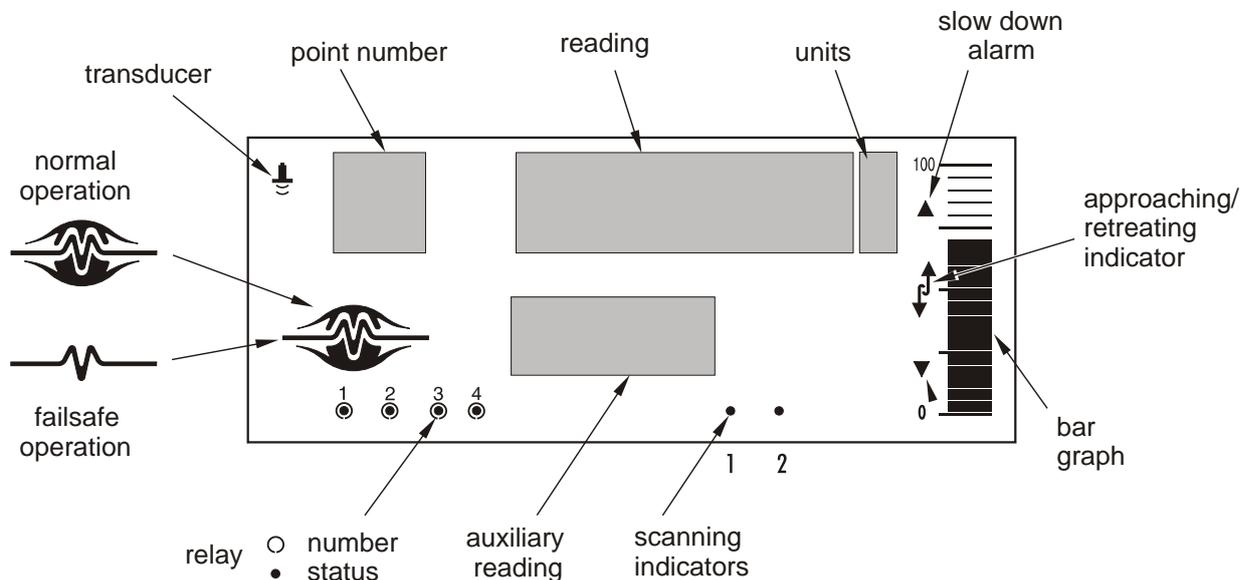
5. OPERATION

With Quick Start Parameter alteration complete, the CraneSonic may be put into operation. (If APPLICATION or ENHAUCEMENT PARAMETERS are altered, OPERATION is altered accordingly from that indicated).

5.1. Display

In the RUN modus, the following values and indicators may be observed.

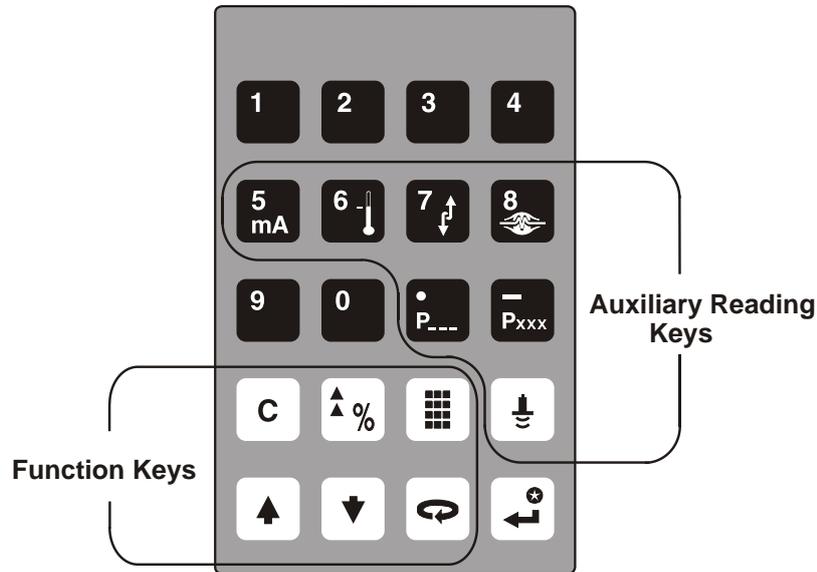
Note that many indicators are specific to certain operating conditions and therefore, all indicators are not displayed at any time..



Transducer	the current display pertains to a Transducer measurement.
Point Number	the Point Number (1to3) the current display pertains to.
Reading	displays the level, space, or distance (flashes error messages,if any).
Percent	the Reading is percent.
Hi Alarm	is indicated.
Lo Alarm	is indicated.
Left/Right Indicator	indicates the direction of distance.
Bar Graph	indicates the absolute distance from 0 to 100 %.
Data out	indicates the CraneSonic is transmitting data to BIC II.
Scanning Indicator	indicates the Point Number which is active.
Auxiliary Reading	as selected by the keypad (terminal number is transducer is wrong).
Relay Number	indicates the relay programmed for operation.
Relay Status	indicates the relay is de-energized (alarm is activated).
Normal Operation	indicates operating conditions are good and the Reading is reliable.
Failsafe Operation	indicates operating conditions are poor and the Reading may be incorrekt.

5.2. Keypad

In the RUN mode, the following programmer keys perform the identified functions.



	selects the Auxiliary Reading	"mA output value" for Point ..
	selects the Auxiliary Reading	"temperature" for Point ..
	selects the Auxiliary Reading	"rate of distance change"
	selects the Auxiliary Reading	"failsafe time left" (in percent)
	selects the Auxiliary Reading	"parameter value"
	selects the Auxiliary Reading	"distance display"
	selects the Auxiliary Reading	"distance to next crane"
	initiates program mode access (see) ,	
	switches the Reading between "Units/percent of Span" (completes program mode access).	
	stops/starts the Point Number auto display scroll.	
	selects the next/previous Point Number (when auto display scroll is stopped).	

5.3. System Performance Evaluation

For initial RUN mode (or after any programming alteration), do not use the CraneSonic to operate process control equipment until satisfactory system programming and performance has been verified.



1. press  to enter the RUN mode....
 "----" may be displayed briefly while the CraneSonic takes measurements and calculates the Reading.

If an alarm symbol is displayed, the corresponding relay is de-energized.

Point #	Alarm Indicator	Relay #
1	H-Alarm	1
1	HH-Alarm	2
2	not used	
2	not used	

2. press  to display Readings in % (percent of Span, P007) based upon Operation (P001).

Distance = 100 to 0 %

Objets close to the transducer face (0%) are not detectable.

3. press  to observe the mA output value for the Point Number displayed.

Distance = 20 - 4/0 mA

Objets close to the transducer face (0/4 mA) are not detectable.

4. press  to observe the Failsafe Time Left /time left in percent before failsafe activation).

Each time a valid measurement is made for the Point Number displayed, this value (Auxiliary Reading) is reset to 100 and begins to fall toward 0 until the next valid measurement is made.

If the Failsafe Time Left reaches 0, the CraneSonic flashes "LOE" in the Reading display.

5.4. Performance Test Results

Monitor system performance carefully, under all anticipated operating conditions.

- A. If the CraneSonic performs exactly as required, copy all Parameters Value alterations to the Programming Charts in the back of this manual. (Altered Parameter Values may be scroll accessed). No further action is required. The CraneSonic will continue performing reliably, with little or no maintenance.
- B. If the CraneSonic provides accurate and repeatable measurements, however alternate Reading units, failsafe action, relay, or mA output operations are desired, proceed to ***APPLICATION PARAMETERS***.
- C. If a measurement difficulty is encountered (the "LOE" display persists after start up), or performance does not meet installation requirements, proceed to the ***TROUBLESHOOTING GUIDE***.

Perform a Reading Measurement simulation to verify programming.

Ensure the ***PROGRAMMING CHARTS*** are altered accordingly, and a new System Performance Measurement is conducted, following any operation alteration or measurement difficulty remedy.

Connect (or enable) process control / alarm equipment to the CranSonic only after satisfactory performance has been verified for all operating conditions.

Return to the RUN MODE for normal operation.

6. APPLICATION PARAMETERS

This section identifies the CraneSonic operator programmable features which may be used to modify the display, failsafe, relay, and/or mA output operation.

6.1 Volume Parameters (P050 bis P055)



6.2 Reading Parameters (P060 bis P062)



If Reading alteration is required, alter the following parameters:

P060 Decimal Position

In the RUN Mode, the number of decimal places displayed is automatically altered when Units (P005) are altered.
Selection:

- 0 = no digits after the decimal point
- 1 = 1 digit after the decimal point
- 2 = 2 digits after the decimal point
- 3 = 3 digits after the decimal point

P061 Convert Reading

Enter the value to multiply the Reading by, (before display). This feature is preset to 1.000 (no conversion)
Possible values:

-999 to 9999

P062 Offset Reading

Enter the value to be added to the Reading, (before display). This feature is preset to 0.000 (no offset).
Possible values:

-999 to 9999



6.3 Failsafe Parameters (P070 bis P072)

As preset, in the event of a measurement or technical difficulty, the CraneSonic holds the Reading, Bar Graph, mA outputs and relays at their last "known" values. To operate process control equipment under these conditions, alter the following parameters as required.

P070 Failsafe Timer

Enter the time to elapse (in minutes, upon a difficulty, before failsafe operation is activated. Possible values:

0.000 to 999

Input: 0.06

If the timer expires due to a measurement difficulty, "LOE" flashes.

P071 Failsafe Conditions

Select the Failsafe Conditions based upon the relay and /or mA outputs operation required during failsafe operation.

Selection:

HI, LO oder HOLD

Input : LO

press  to display the Auxiliary Function symbol,

press  or  as required to scroll access thr desired option,

press  to confirm alteration

P072 Failsafe Response

Selct the restriction applied to the CraneSonic advance to (and from) the Failsafe Conditions (P071).

Selection:

1 = restricted

2 = immediate

Input: 2 = immediate



6.4 Relays Parameters (P100 bis P104, P110 bis P113 und 129)

If relays are to be used, alter the following parameters as required.

P100 (G) Relay Set Up

Selection:

- 1 = Min. and Max
- 2 = Max. and Max/Max. Alarm
- 3 = Min. and Min/Min
- 4 = Max, Max/Max, Min and Min/Min

Input: 2 = Max. and Max/Max. Alarm

P101 Max. Alarm (HI)

Enter the Max. Alarm for switching point of the Slow down Relay.
Possible values:

-999 to 9999

Input: 30 (means switching point at 30m)

P102 preset

P103 Max/Max. Alarm (HIHI)

Enter the Max/Max. Alarm for switching point of the Stop Relay.
Possible values:

-999 bis 9999

Input: 40 (means switching point at 20m)

P104 preset

P110 preset

P111 preset

P112 preset

P113 preset

P129 preset



6.5 mA Output Parameters (P200 bis P203, P210 bis P215 und 219)

If CraneSonic mA outputs are to be used, alter the following parameters as required. When a mA Output Parameter is accessed, the mA symbol is displayed in the Point Type field and the mA output number is displayed in the Point Number field.

P200 mA Range

Selection:

- 0 = OFF
- 1 = 0 to 20 mA
- 2 = 4 to 20 mA
- 3 = 20 to 0 mA
- 4 = 20 to 4 mA

P201 mA Function

Selection:

- 1 = ...
- 2 = ...
- 3 = distance !!(alter when activating P200)
- 4 = ...

P202 mA Allocation

Selection:

- 1 = Point 1 !!(alter when activating P200)
- 2 = ...
- 3 = ...
- 4 = ...

P203 (V) View the current value. (in RUN mode press )

P210 preset

P211 preset

P212 preset

P213 preset

P214 preset

P215 preset

P219 preset

7. ENHANCEMENT PARAMETERS

This section identifies all CraneSonic programmable features, designed for altering operation to suit individual operator preferences or overcome measurement difficulties.

Typically, these parameters are only altered as directed by the TROUBLESHOOTING GUIDE. If RUN mode performance requires improvement, access and alter the following Parameters as required. (Several parameters must be changed for the crane application)

7.1 Data Logging Parameters (P300 bis P302)



7.2 Range Calibration Parameters (P650 bis P654)



7.3 Temperature Compensation Parameters (P660 bis P664)



Only necessary when using a TS-3 Temperature sensor or from 1997 a transducer with an integral temperatur sensor.

P660 Temp Source

This feature is preset to "Auto".
Selection:

- 1 = Auto
- 2 = Temp Fixed
- 3 = Ultrasonic/Temperature Transducer
- 4 = TS-3 Temperature Sensor
- 5 = Average
- 6 = TS-3 Sensor # 1

P661 Temp Fixed

Use this feature if a temperature sensing device is not used.
Possible values: (preset to 20.00°C)

-50 to 150

P662 preset

P663 preset

P664 (V) Temperature value displayed (in RUN mode press ).
Only when using TS-3 or internal compensation.



7.4 Rate Parameters (P700 bis P707)

P700 Rate I

Adaptation of the max. speed change of the CraneSonic when another crane moves closer. Possible values:

0.000 to 9999

Input: 9999

P701 Rate II

Adaptation of the max. speed change of the CraneSonic when another crane is moving away. Possible values:

0.000 to 9999

Input: 9999

P702 preset

P703 preset

P704 preset

P705 preset

P706 preset

P707 (V) Rate of crane moving. (in RUN mode press )

7.5 Measurement Verification Parameters (P710 bis P713)



7.6 Scanning Parameters (P725 bis P729)





7.7 Display Parameters (P730 bis P733, P740)

P730 (G) **preset**

P731 (G) **preset**

P732 (G) **preset**

P733 (G) **preset**

P740 **Peripheral Communications**

Use this feature to select the CraneSonic to BIC-II, ASCII message format.

Selection:

0 = OFF

1 = normal BIC-II message

2 = formatted BIC-II message

Input: 0 = OFF



7.8 Echo Processing Parameters (P800 bis P807)

P800 **Near Blanking**

The Near Blanking distance (distance from the transducer face which is not ultrasonically measurable) is automatically set to minimum, when the the Transducer (P004) value is entered.

Possible values:

0,000 to 9999

Input: 3,5

P801 **Range Extension**

Possible value:

0.000 to 9999

Input: 25

P802 **not used**

P803 **preset**

P804 **Confidence Threshold**

The short and long Confidence Thresholds are preset to 10 and 5 respectively.

Selection: X.Y

X = short (0 to 99)

Y = long (0 to 99)

Input: 50 . 20

P805 (V) **Echo Confidence**

Use this feature to monitor the effect of transducer aiming, location, and mechanical transducer/ mounting isolation.

This is the value when  is pressed for 4 seconds in the RUN mode. Both short and long shot Echo Confidence is displayed.

„--" is displayed if the respective shot was not included in the evaluation.

„E" is displayed if the transducer is open or short circuited.

„--:--" is displayed if no shots have been taken yet.

Possible values: **X:Y X = short (0-99) Y = long (0-99)**

P806 (V) **Echo Strength**

Use this feature to view the strength (in dB above 1yV rms) of the echo selected to base the distance calculation upon.

Possible values: **0 to 99**

P807 (V) **Noise**

Observe the average and peak ambient noise (in db above 1 yV rms) beeing processed.

The noise level is a combination of transient acoustic noise and electrical noise (induced into the transducer cable or receivend circuitry itself).

Possible values: **X:Y X = peak (-99 to 99) Y = average (-99 to 99)**



7.9. Advanced Echo Processing (P810, P816 - P825, P830 - P835, P840 - P845, P850 - P852)

P810 **Scope Displays** (only for service)

P816 (V) **Echo Time** (display only)



7.10. Profile Pointer Parameters

P817 (V) **Profile Pointer Time** (display only)

P818 (V) **Profile Pointer distance** (display only)

P819 (V) **Profile Pointer Amplitude** (display only)

P820 **Algorithm**

Use this feature to select the Algorithm(s) (mathematical operations) which the Sonic Intelligence™ echo selection is to be based on.

To select an Algorithm....

1. press  to display the Auxiliary Function symbol.
2. press  or  to display the desired Reading display symbol(s).
3. press  (when the desired Algorithm is displayed)

Selection: ALF ; A ; L ; F ; AL ; AF ; LF ; bLF ; bL ; F

Input: F

P821 **preset**

P822 **Narrow Echo Filter**

Use this feature if an echo from a partial transducer beam abstraction is processed. Enter the width of false echoes (in ms), to be removed from the long shot Echo Profile.
values: (when a value is keyed in, the nearest acceptable value is entered).

0 = OFF, greater = wider

Input: 1.901 (is automatically adapted)

P823 Reform Echo

Use this feature if the reported distance fluctuates slightly. Enter the amount (in ms) of long shot Echo Profile smoothing required to eliminate jagged peaks in the Echo profile.

Possible values: (When a value is keyed in, the nearest acceptable value is entered)

0 = OFF, greater = wider

Input: 14.97 (is automatically adapted)

P824 Reserved

P825 Echo Marker Trigger

Use this feature when the reported distance fluctuates slightly, due to a variable rise in the leading edge of the true echo on the Echo Profile.

Possible values:

5 to 95

Input: 95

P830 TVT Type

Use this feature to select the TVT Curve most suited to the application.

Selection:

- 1 = TVT short curved
- 2 = TVT short flat
- 3 = TVT long flat
- 4 = TVT long smooth front
- 5 = TVT long smootht
- 6 = TVT special

Input: 6 = TVT special

P831 preset

P832 preset

P833 preset

P834 TVT Start Duration

Use this feature in conjunction with TVT Start Min (P833) to ignore false echoes near the start of the Echo Profile.

Possible values:

0 to 9999

Input: 20

P835 TVT Slope Min

Enter the minimum slope (in dB/s) for the middle portion of the TVT Curve.

Possible values:

0 to 9999

Input: 150

P840 Short Shot Number

Enter the number of short shots to be fired (and results averaged) per transmit pulse.

Possible values:

0 to 100

Input: 0

P841 preset

P842 preset

P843 preset

P844 preset

P845 preset

P850 preset

P851 preset

P852 preset



7.11 Test Parameters (P900 bis P903)

Test Parameter are intended for use by Service personnel.

P900 (V) **Software Rev.#**

Access this parameter to determine the EPROM Rev.# without removing the enclosure lid.

Possible values: 00.00 to 99.99

P901 (V) **Memory**

press  to activate the CraneSonic memory test.

When the test is successful, "PASS" is displayed. Otherwise, one of the following values is displayed, indicating the type of memory failure.

Possible values:

PASS	(memory test successful)
F1	= RAM
F2	= NOVRAM
F3	= EEPROM
F4	= EPROM

P902 (V) **Watchdog**

press  to reset the microprocessor. On successful completion (in about 10 seconds) the CraneSonic enters the RUN mode.

P903 (V) **Display**

press  to activate the display test. All LCD segments and symbols are temporarily displayed.



7.12 Master Reset (P999)

P999 Master Reset

A Global Master Reset (reset all Parameters to preset values) should be performed:

- to clear all operator programming from memory.
- after replacing the CraneSonic EPROM with a different software revision number.

Following a Global Master Reset, complete reprogramming is required.

To perform a Global Master Reset:

1. with the Parameter Number field accessed, key in 999,
2. with the Point Number field accessed, key in 00,
3. press  and , "C.ALL" is displayed until the reset is complete.

8. MAINTENANCE

The CraneSonic requires no maintenance, though good housekeeping practices in and around the area of the enclosure are recommended.

Wipe out the area of the enclosure lid docking bay recess with a clean dry cloth (if necessary) before installing the programmer.

To verify the effectiveness of the self cleaning design, transducer inspections are recommended. If material build up on the transducer face is observed, to maintain maximum system performance, a schedule of regular cleaning should be adopted.

9. TROUBLESHOOTING GUIDE

9.1. Symptom-Cause-Action Chart

Symptom	Cause	Action
Display blank, Transmit Neon not Flashing, transducer not pulsing	No power	Check power supply, wiring, J1 jumper position, power fuse FU1
No response to programmer	obstructed infrared interface, or defective programmer or battery empty	Clean enclosure "docking bay" and programmer magnet slot, change battery
Displays "SHORT" and "tb:(#)".	normally, at a short time when the relais connect the transducer to the amplifier. By permanend display: shorted circuit transducer cable, or defective transducer	-nothing to do -repair or replace as necessary
Displays "OPEN" and "tb:(#)"	normally when the crane is not running	by permanend display check the wiring
Displays "ERROR" and "tb:(#)"	transducer connected wrong	Reverse BLK and WHT wires
	wrong transducer (P004)	Enter correct value
Displays "LOE"	weak or non-existent echo, normally when the other crane fare away	when the distance to next crane is nearer then 60-85m the display must show this, otherwise relocate and/or reaim transducer at objekt
Displays "EEEE"	Reading to high	Select larger Units (P005), or lower Convert Reading (P061)
Reading is fixed, regardless of the actual distance	Transducer beam obstructed, stand-pipe too narrow, or mounting resonant	Relocate and /or reaim transducer at objekt
Reading is erratic, with little or no relation to distance	True echo too weak or wrong echo being processed.	Relocate and /or reaim transducer at objekt

10. SPECIFICATIONS

10.1 CraneSonic

Power:	100/115/200/230 V 15%, switch SW1 50 / 60 Hz, 15 VA
Power Fuse:	0,25 A MDL Slo-Blo or equivalent
Scan Points:	2 points, <u>for crane application only 1 used</u>
Range:	1,5 m to 60m max.
Crane Speed:	max. 2.8 m/s (5.6 m/s combined approach speed for two cranes)
Accuracy:	+/- 0,5 % of range
Resolution:	+/- 0,25 % of range
Memory:	EEPROM (no battery required)
Programming:	via removable programmer
Display:	Custom Graphics LCD, 51mm x 127 mm viewing area
Ambient Temperature:	-20 to 50 °C (-5 to 122 °F)
Temperature Compensation:	1. TS-3 temperature sensors 2. transducer with temperature compensation 3. programmable fixed temperature <u>for crane application not used</u>
Temperature Error:	with compensation 0,09 % of range without compensation 0,17 %/°C deviation from programmed temoerature.
Transducer Drive:	315V peak for S-60
Relays:	4 alarm/control relays, 1 form "C" SPDT contact per relay, rated 5 A at 250 V ac, non-inductive <u>for crane application only 2 used</u>
Analog Output:	2 output max, 0,1 % resolution 0-20 or 4-20 mA, scalable 350 ohms max. load (common ground) 750 ohms max. load (floating common) <u>for crane application not used</u>

Communication:	serial bipolar current loop: with BIC-II spezial module
Enclosure:	CSA enclosure 4 (similar to NEMA4) IP 65 285 x 209 x 92 mm (WxHxD) 11.2" x 8.2" x 3.6" polycarbonate
Shipping weight:	2,9 Kg (6,3 lb)

10.2. Programmer

Power:	9 V (Ansi/Neda 1604, PP3 or equivalent)
Ambient Temperature:	-20 to + 50 °C (-5 to 122 °F)
Keypad:	20 keys with tactile feedback
Interface:	non-invasive, digital, infra-red
Mounting:	magnetic, removable
Enclosure:	ABS plastic 67 x 100 x 25 mm (WxHxD) 2.6" x 4" x 1"
Shipping weight:	150g (0,3 lb)

10.3. Transducer R13-FM or S 60 or T 60

Range:	up to 60m, for crane application up to 40m
Frequency:	13 kHz
Ambient Temperature:	-40 to + 70 °C (-40 to 170°F)
Transmitting Surface:	aluminium/ 304 stainless steel
Enclosure Material:	aluminium
Beam Angle:	5,5 °
Protection:	IP 65

11. PROGRAMMING CHARTS

11.1 Programming Chart 1 (crane application used as an example)

Parameter		Possible Inputs	Values for Point #1
#.	Name		

Security



P000 (G)	Lock	1954 or	
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Schnellstartparameter



P001	Operation	0,1,2,3,4,5,8	3
P002	Material	1,2	1
P003	Measurement Response	1,2,3,4,5	5
P004	Transducer	0,1,2,3,4,5....110	110
P005 (G)	Units	1,2,3,4,5	1
P006	Empty	0.000 to 9999	60
P007	Span	0.000 to 9999	60

Volume



Reading Value



P060	Decimal Position	0,1,2,3	
P061	Convert Reading	-999 to 9999	
P062	Offset Reading	-999 to 9999	

Failsafe



P070	Failsafe Timer	0,000 to 999	0,06
P071	Failsafe Conditions	HI, LO, HOLD	LO
P072	Failsafe Response	1,2	2

11.2 Programming Chart 2 (crane application used as an example))

Parameter		Possible Inputs	Values for Point 1
#	Name		

Relays



P100 (G)	Relay Set Up	1,2,3,4	2
P101	Max. Alarm	-999 to 9999	30
P102	preset		
P103	Max./Max. Alarm	-999 to 9999	40
P104	preset		
P110	preset		
P111	preset		
P112	preset		
P113	preset		
P129	preset		

mA-Output



P200	mA-Range	0,1,2,3,4	
P201	mA-Function	1,2,3,4	
P202	mA-Allocation	1,2,3,4	
P203 (V)	preset		
P210	preset		
P211	preset		
P212	preset		
P213	preset		
P214	preset		
P215	preset		
P219	preset		

Data Logging



Range Calibration



Temperature Compensation



P660	Temp Source	1,2,3,4,5,6	
P661	Temp Fixed	-50 bis 150	
P662	preset		
P663	preset		
P664 (V)	preset		

11.3 Programming Chart 3 (crane application used as an example)

Parameter		Possible Inputs	Values for Point 1
#	Name		

Rate



P700	Rate I	0.000 to 9999	9999
P701	Rate II	0.000 to 9999	9999
P702	preset		
P703	preset		
P704	preset		
P705	preset		
P706	preset		
P707 (V)	preset		

Measurement Verification



Scanning



Display



P730 (G)	preset		
P731 (G)	preset		
P732 (G)	preset		
P733 (G)	preset		
P740	Communications	0,1,2	0

Echo Processing



P800	Near Blanking	0.000 to 9999	3,5
P801	Range Extension	0.000 to 9999	25
P802	preset		
P803	preset		
P804	Confidence Treshhold	0 to 99. 0 to 99	50.20
P805 (V)	Echo Confidence		
P806 (V)	Echo Strength		
P807 (V)	Noise		

11.4 Programming Chart (crane application used as an example)

Parameter		Possible Inputs	Values for Point 1
#	Name		

Advanced Echo Processing



P810	preset		
P816 (V)	preset		
P817 (V)	preset		
P818 (V)	preset		
P819 (V)	preset		
P820	Algorithm	ALF,A,L,F,AL,AF,LF,bLF,bL,F	F
P821	preset		
P822	Narrow Echo Filter	0, >0	1.901
P823	Reform Echo	0, >0	14.97
P824	preset		
P825	Echo Marker Trigger	5 to 95	95
P830	TVT Type	1,2,3,4,5,6	6
P831	preset		
P832	preset		
P833	preset		
P834	TVT Start Slope	0 to 9999	20
P835	TVT Slope Min	0 to 9999	150
P840	Short Shot Number	0 to 100	0
P841	preset		
P842	preset		
P843	preset		
P844	preset		
P845	preset		
P850	preset		
P851	preset		
P852	preset		

Test



P900 (V)	Software Rev.#	00.00 bis 99.99	
P901 (V)	Memory	PASS,F1,F2,F3,F4	
P902 (V)	Watchdog		
P903 (V)	Display		

Master Reset



P999	Master Reset		
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12. Display under normal conditions

We deliver the CraneSonic unit with fixed parameters for a normal crane application.
The complete system is already tested.

Normally you change only the parameter P101/P103 for the slow down and stop-relais.

put into operation:

- please proof the wiring
- select the power switch to the right voltage (preset to 230VAC)
- turn the power on

display:

- the crane is not in motion, no signal from PLC to CraneSonic-switchingboard
 - the display alternate between **“OPen” und “60.00”**
- the crane moves in one direction, the PLC switch on the additional relais to connect one transducer to the CraneSonic-amplifier, the transducer transmit pulses (you hear it) :
 - no crane in a distance <85m the display alternate between **“LOE” und “60.00”**
(please note, after switching on the transducer relais sometimes the display shows **“Short”** this is normal
 - if the distance becomes nearer then 85m **“85.00”**
the CraneSonic can calculate it and shows it on the display. Dependent on the crane speed the display decrease in 2-5m steps to the slow down and stop switch of parameters (P101/P103).

