

# 9:302C

## Overload Protection System










SYMBOLS USED.....	3
IMPORTANT INFORMATION.....	3
GENERAL – INTENDED USE.....	4
CONSTRUCTION.....	4
SAFETY INFORMATION AND WARNINGS .....	4
SPECIFICATIONS.....	4
SAFETY AND ENVIRONMENT .....	5
FUNCTION.....	5
INSTALLATION - ENCLOSURE .....	5
INSTALLATION - WIRING.....	6
INSTALLATION - POWER SUPPLY .....	6
INSTALLATION - FORCE TRANSMITTER WIRING.....	6
INSTALLATION – ANALOGUE OUTPUT 4-20mA WIRING .....	6
INSTALLATION – RELAY OUTPUTS LIM1 LIM2 AND OTE WIRING.....	7
PUSH BUTTONS .....	8
MENU OVERVIEW.....	8
PARAMETER SETUP .....	11
INSTALLATION – FORCE TRANSMITTER SETUP AND CALIBRATION .....	16
CALIBRATION PROCEDURE FOR A REDUNDANT FORCE TRANSMITTER:.....	18
CALIBRATION PROCEDURE FOR ONE CHANNEL FORCE TRANSMITTER:.....	21
ADJUSTMENTS & TEST OF PERFORMANCE .....	22
MAINTENANCE .....	22
TROUBLESHOOTING .....	22
SUMMARY OF CODES .....	25
IDENTIFICATION AND SPARE PARTS.....	25
REPLACEMENT OF PARTS AND DISPOSAL .....	25
RECOMMENDED SPARE PARTS .....	25
CE-CERTIFICATION .....	25
CONTACT .....	25

**Revision history:**

Rev 000_2018-03-06	First edition
Rev 001_2018-03-15	Changed from polycarbonate to ABS (page 4)

## SYMBOLS USED

The following symbols are used throughout this documentation, and/or marked on the product:

	CAUTION. This symbol on the equipment indicates that the manual must be consulted. In this manual it appears before instructions, which if not followed, may result in product damage or improper function.
	CE-mark. Indicates that we as a manufacturer declare that this product is in conformity with all relevant CE-marking Directives.
	Protective Conductor Terminal
	Caution, risk of electric shock.
	Direct current.
	Alternating current.
	Follow local regulations regarding recycling at disposal of this product. This product must be disposed of separately, and not with normal household waste. See separate section in this manual.

## IMPORTANT INFORMATION

To ensure safe operation, this manual, together with applicable local user industry's safety rules and regulations must be followed.

Gigasense product warranty is not valid if other modifications than those described in this manual are made.

Gigasense AB will not be responsible for any other use of this product than the intended use, which is specified in this manual.

The buyer of this product is responsible for giving only adequately trained people access to installation, commissioning, maintenance and usage of this product. The users and installation personnel must have read and understood this manual, before using or installing this product.

The instructions in this manual must be followed in installation, usage and maintenance procedures.

Gigasense AB will not accept any responsibility for failure due to misuse, improper installation or improper maintenance.

Apart from the above, there may be local laws, safety regulations and directives from public authorities, relevant for the use of this product.

## GENERAL – INTENDED USE

9:302C is an overload protection system intended for use in cranes with a single hoist. One force transmitter with a signal output of 0 – 2 mV/V used with the 9:302C overload protection system.

To conform with European standards, a redundant force transmitter shall be used. The system conforms with performance level C, category 2, according to standard SS-EN ISO 13849-1, with a redundant force transmitter. The system can work with a single channel force transmitter (non redundant force transmitter) where local regulations allow. We always recommend to use a redundant force transmitter with the 9:302C overload protection system.

## CONSTRUCTION

The 9:302C overload protection system has an enclosure made of ABS with a transparent lid, which covers the push buttons, display and LEDs. The transparent lid can be open without tools. A non transparent lid covers the connections and calibration potentiometers. Cable glands are used for the electrical connections.



## SAFETY INFORMATION AND WARNINGS

- Pay attention to turn off all power before opening the non transparent lid.  
In some certain cases described in this manual, it is allowed to have the lid open while the system is working, but connections to the relays **MUST** be isolated or disconnected from hazardous voltage!
- Turn off all power if any work is to be done on the system. The 9:302C is powered with either 24VDC or 100-240VAC, 50-60Hz.
- Only use one of the inputs for the mains supply!
- Electrostatic discharge (ESD) - be careful when opening the non transparent lid.
- Safety mechanisms must not be bypassed without evaluation of the risk assessment.
- Supplementary protective measures may be required on the basis of risk assessments for the application.
- If the system is operated in conjunction with other components, the corresponding user information must be followed.
- Function of external devices connected to the outputs of the 9:302C must be evaluated to ensure safe operation.
- Maximum length of the wires between force transmitter and 9:302C is 10 meters.
- The output relays are allowed for connections up to 250VAC/5A, 24VDC 6A.
- The installation of the system must be performed by authorized technical personnel.
- The system must be taken out of operation in the event of damage.
- The personnel who work, install and operate the system are responsible for understanding the function and installation prescriptions described in this manual. If any questions or uncertainties occur, Gigasense AB must be informed before the system is put in operation.
- A correct assembly of the system is essential for the correct operation of the system.
- A correct function must be verified before the system is put in normal operation.
- If this equipment is used in a manner not specified in this manual, or by Gigasense AB personnel, protection or function normally provided by this equipment may be reduced.
- The 4 – 20 mA analogue output shall be used for load indication and shall not be used for safety related purposes.
- Maximum altitude 2000m in operation.

## SPECIFICATIONS

- Type designation: 9:302C.
- Supply Voltage: 100-240 VAC 50/60 Hz or 24 VDC.
- Power consumption: 10W
- Permitted ambient temperature: -25 °C ... 70°C.
- Degree of protection (EN60529): IP65 (the transparent door must be closed).
- Dimensions: 235 x 185 x 119mm.

## SAFETY AND ENVIRONMENT

- Avoids crane overload accidents and protects property and production.
- Fail Safe operation thanks to supervision of function, all three relays are put in alarm position if an internal failure or a force transmitter failure occurs.
- The system conforms with SS-EN ISO 13849-1, performance level C, category 2.
- Always keep the transparent door closed.
- Always keep the non transparent lid mounted.

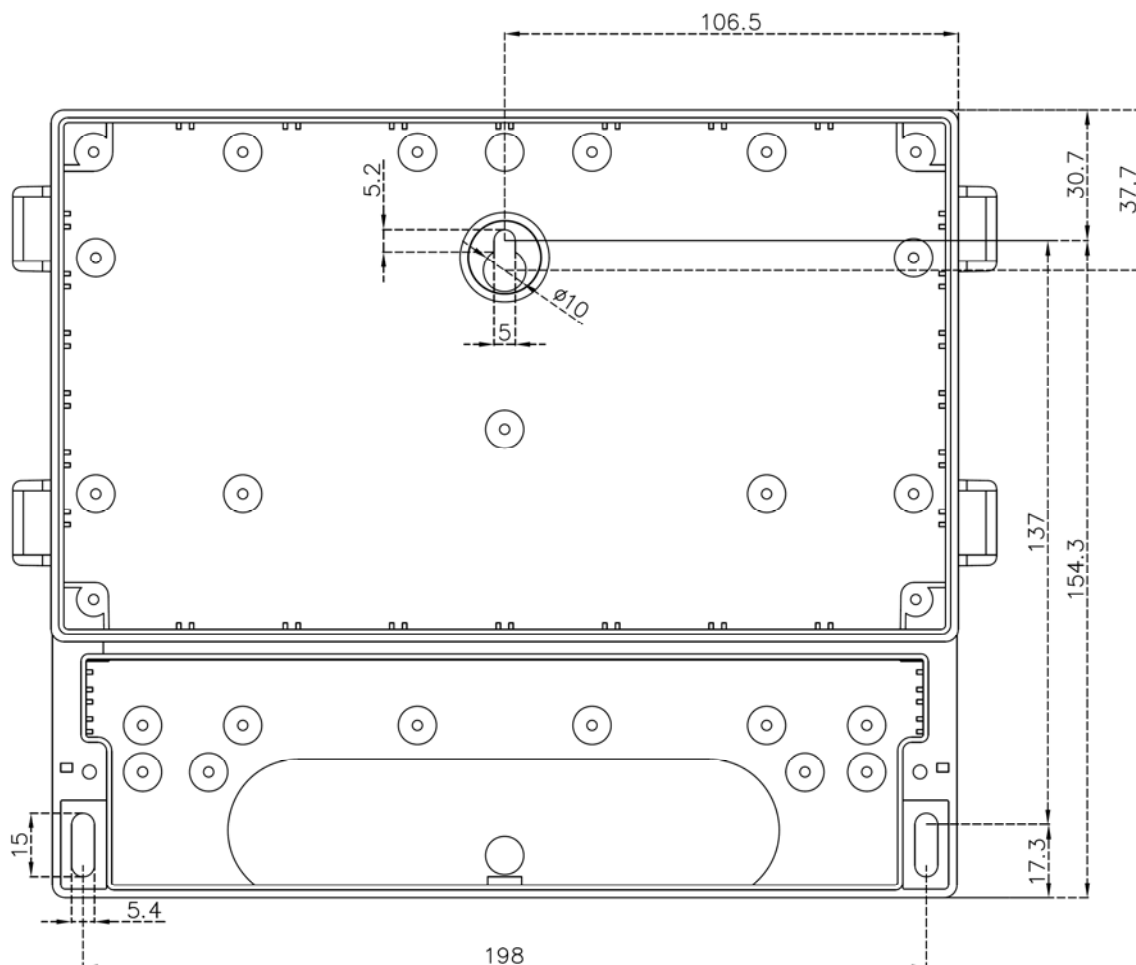
## FUNCTION

The overload protection system 9:302C receives a mV/V signal from the force transmitter. The electronics of the 9:302C process and evaluates the mV/V value. By use of three thresholds, the two output relays are controlled. The green LEDs on the front panel indicate the status for each relay. When the relay has switched, the green LEDs turns off the light. Slack rope detection can be used either as relay on (closed circuit), or relay off (open circuit) when the limit threshold is exceeded.

The relay output, OTE (Output Test Equipment), informs the user that the system performs with no system failures. In case of any internal failure or sensor failure, the relay will indicate an alarm and put the system in failsafe state.

## INSTALLATION - ENCLOSURE

The 9:302C is attached with three screws according to drawing:



## INSTALLATION - WIRING



**TURN OFF THE POWER SUPPLY (MAINS SUPPLY) BEFORE WIRING.  
WIRING IS ONLY ALLOWED TO BE PERFORMED BY AUTHORIZED PERSONNEL.**

## INSTALLATION - POWER SUPPLY



**WARNING: Only use one of the inputs for the mains supply!  
The mains supply to 9:302C can be either 100 – 240 VAC or 24 VDC (18-30 VDC).**

The power supply wiring shall be rated for voltage used, 0,75 mm<sup>2</sup> rated 70°C (100 – 240 VAC supply) and 0,5 mm<sup>2</sup> rated 70°C (24 VDC supply).

The power supply should include an all-pole switch according to local regulations for disconnection of the power supply. It must be suitably located and easily reached. Mark it as "Disconnecting device" for this equipment. Rated for the supply voltage and current. Fuse maximum 10 A (100 – 240 VAC supply) and 0,5 A (24 VDC supply).

If 100- 240 VAC supply is used, the protective earth (PE) shall be connected to the terminal "PE".  
24 VDC power supply does not require protective earth (PE).

## INSTALLATION - FORCE TRANSMITTER WIRING

A force transmitter with 350 – 700 Ohm strain gauge bridge can be used.

If a force transmitter with 1000 Ohm strain gauge bridge is used, a resistor must be replaced by Gigasense.



**One channel force transmitter, connect to the terminals marked with "Channel 1".**



**Two channel (redundant) force transmitter, connect to the terminals marked with "Channel 1" and "Channel 2".**

### **4-wire force transmitter:**

Ex+ = Excitation voltage +

Sig+ = Signal +

Sig - = Signal -

Ex- = Excitation voltage -

Shield shall be connected to the terminal "Shield"

### **6-wire Force transmitter:**

Ex+ = Excitation voltage +

Sens + = Sensitive + (connect to Ex+)

Sig+ = Signal +

Sig - = Signal -

Ex- = Excitation voltage -

Sens - = Sensitive - (connect to Ex-)

Shield shall be connected to the terminal "Shield"



## INSTALLATION – ANALOGUE OUTPUT 4-20mA WIRING

**The analogue output shall not be used for safety related purposes.**

The analogue output is an active loop (provides 12VDC) and can be used to show the actual load on i.e. a remote display. Connect the remote device to terminals marked with "4-20mA":

**Terminal +**

**Terminal GND**

## INSTALLATION – RELAY OUTPUTS LIM1 LIM2 AND OTE WIRING

The relay outputs marked with LIM1 and LIM 2, are controlled by the settings for respectively threshold limits, see parameter settings menu.



**LIM1 relay shall not be used for overload detection.**

The relay output marked LIM1, can be used for either warning or slack rope.  
**Max. load 250VAC/5A or 24VDC 6A.**



**LIM2 RELAY:**

**The relay output marked LIM2, shall be used for overload detection.**  
**Max. load 250VAC/5A or 24VDC 6A.**



**OTE (Output Test Equipment) RELAY:**

**The relay output marked OTE, shall be connected to the crane control system. In case of system errors in the 9:302C system, the OTE relay shall stop the crane and indicate the error to the operator. The problem that occurred must be investigated and repaired before the crane is put in operation again.**

**Max. load 250VAC/5A or 24VDC 6A.**



**Connection of the relay outputs main wires must not cross secondary wires.**

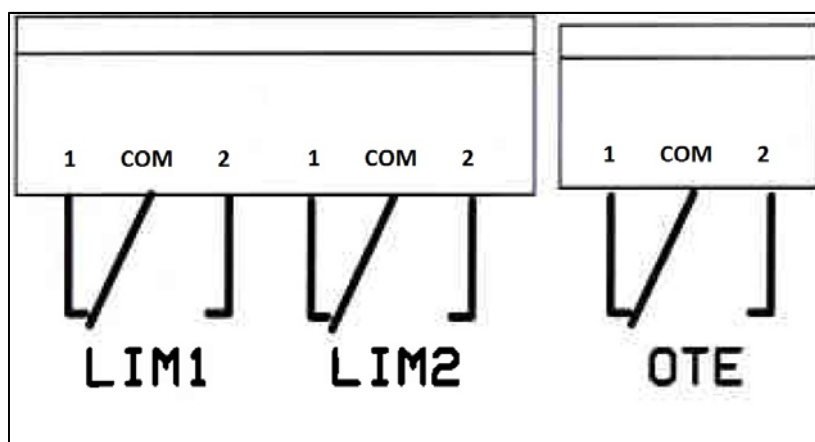
When the mains supply is connected to the 9:302C and no alarms are active, the relays energize (depending of settings, actual load and if no internal errors are present).



**The relay outputs shall be connected as a closed circuit to the crane control system. In case of internal failure or power failure, the relays open the circuit, the crane hoist movement is stopped.**

To use a closed circuit to the crane control system, connect to:  
 LIM1: COM and 2 (depending of setting, see menu "PARAMETER SETUP").  
 LIM2: COM and 2  
 OTE: COM and 2

The figure below shows the relays with no current floating through the coils, corresponding to alarm state.



## PUSH BUTTONS

- **MENU** scrolls forward in respectively menu.
- **Minus (-)** button decreases value / change parameter. If button is pushed for more than 3 seconds, the figures turns quicker.
- **Plus (+)** button increases value / change parameter. If button is pushed for more than 3 seconds, the figures turns quicker.
- **ENTER** button saves changed value / changed parameter.

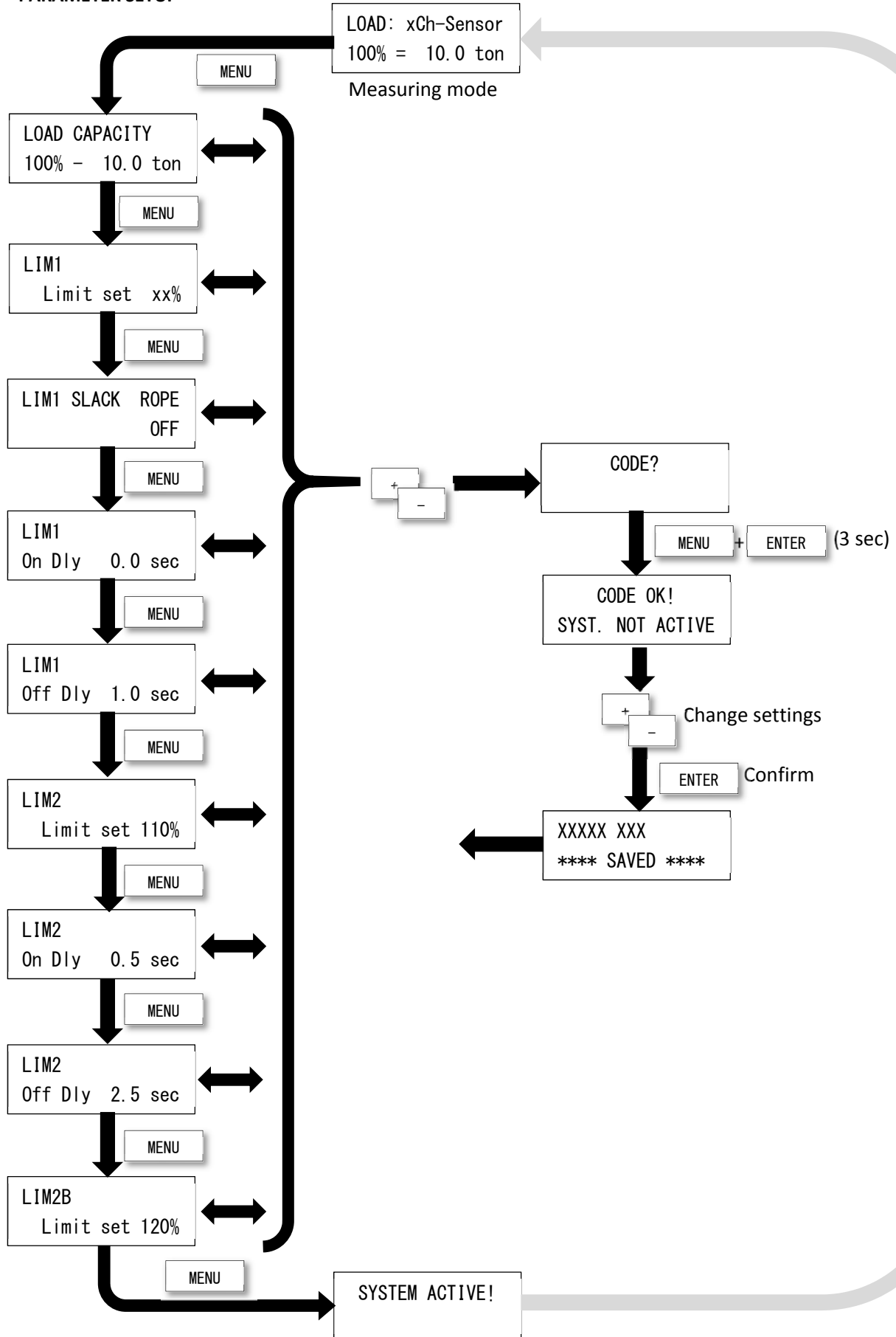
## MENU OVERVIEW

The following two pages shows the menu structures. The menus consists of two parts:

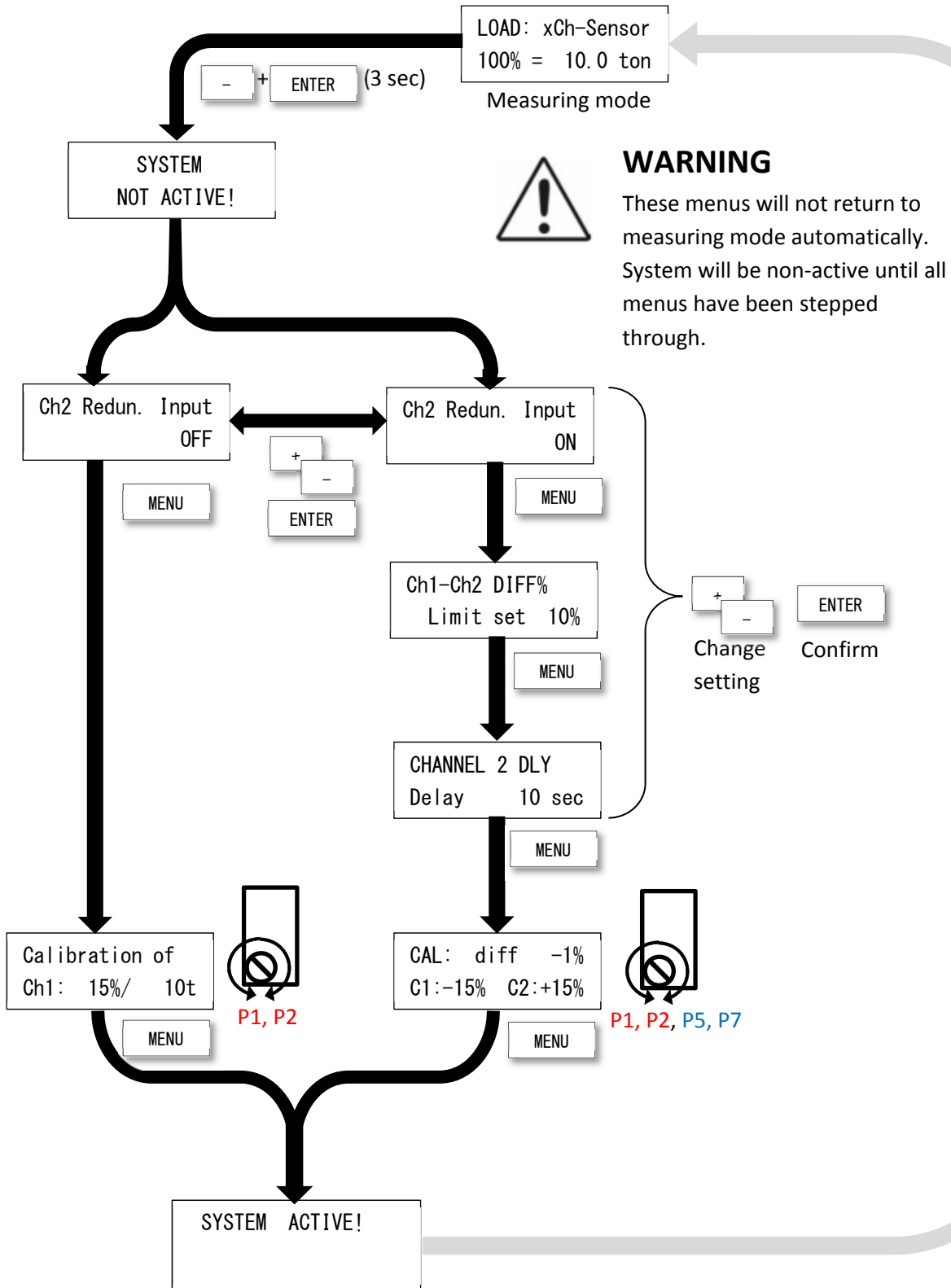
- PARAMETER SETUP.
- FORCE TRANSMITTER SETUP AND CALIBRATION.



**PARAMETER SETUP**



**FORCE TRANSMITTER SETUP AND CALIBRATION**



## PARAMETER SETUP

In measuring mode (1Ch-Sensor or 2Ch-Sensor):

L	O	A	D	:		2	C	h	-	S	e	n	s	o	r
1	0	0	%	=			1	0	.	0		t	o	n	

Enter the "PARAMETER SETUP" menu by pushing the **MENU** button.

At anytime, the **Minus (-)** button or the **Plus (+)** button can be pushed, if a value / parameter is to be changed. Then the display "Code?" Is shown:

					C	O	D	E	?						

The code must be set by operator within 30 seconds, otherwise, the system returns to previous menu (the measuring menu). The operator is allowed to step through the menu and leave it anytime, as long as the code is not entered. As soon as the code is entered, the menu must exit by the last step, the operator receives the message "SYSTEM ACTIVE", the relay outputs are active again.

The code is: push the **MENU** button and the **Enter** button at the same time for 3 seconds.

Following menu is shown if the code is correct:

				C	O	D	E		O	K	!				
S	Y	S	T	.		N	O	T		A	C	T	I	V	E



**The system is not active, which means the system will not activate the relay outputs according to the preset alarm limit thresholds. The relays are in "freeze" position.**



Changed parameters must be confirmed (saved) with **ENTER** button. The following display is shown shortly when ENTER button is pushed:

X	X	X	X	X		X	X	X							
*	*	*	*		S	A	V	E	D		*	*	*	*	



If the parameters are changed but not saved, with the ENTER button, AND/OR the menu is not exit by the last step, an alarm, "CRC-16 FAILURE", will occur.

The system is put in "Failsafe state", which means the relay outputs are in alarm position.

	C	R	C	-	1	6		F	A	I	L	U	R	E	
F	A	I	L	S	A	F	E		S	T	A	T	E		

To reset the “CRC-16 FAILURE” error: Push **PLUS (+)** and **ENTER** at the same time for 3 seconds.

Return to the “PARAMETER SETUP” menu again, to verify that the parameters are set accordingly.



**When all settings are done, exit the “PARAMETER SETUP”! The operator must step through the menu to the end and exit, otherwise the “CRC-16 FAILURE”, will occur.**

This display is shown for one second when the operator exit the “PARAMETER SETUP” menu:

	S	Y	S	T	E	M			A	C	T	I	V	E	!

The system is now in measuring mode and the relay outputs will activate at preset alarm limit thresholds.

Measuring mode:

L	O	A	D	:		2	C	h	-	S	e	n	s	o	r
1	0	0	%		=			1	0	.	0		t	o	n



**Hysteresis for Limit 1 and Limit 2**

Limit 1 and Limit 2 has a hysteresis of 2%.

For Limit 1, the slack rope detection, will not release the alarm for Limit 1 until the force is 2% above the value set for slack rope. E.g. Limit 1 threshold for slack rope is set to 10%. Slack rope is active, until 12 % of the force is reached.

For Limit 2, the overload protection, will not release the alarm for Limit 2 until the force is 2% less than the set value for overload detection. E.g. Limit 2 threshold for overload is set to 110%. Overload Limit 2 is active, until 108 % of the force is reached.

The hysteresis is superior to the delay settings for Limit 1 and Limit 2.

## Menu sequence for “PARAMETER SETUP”:

### 1. Set the maximum capacity of the crane

L	O	A	D		C	A	P	A	C	I	T	Y			
1	0	0	%	=				1	0	.	0		t	o	n

Range: 0,1 to 999 ton

Default value: 10 ton

### 2. Set limit 1 threshold value, slack rope detection or warning



**Limit 1 shall not be used for overload detection!**

L	I	M	1												
		L	i	m	i	t		s	e	t			x	x	%

Range: -20% to 140%

Default value: 5%

### 3. Set function of the relay output for slack rope detection

L	I	M	1		S	L	A	C	K			R	O	P	E
													O	F	F

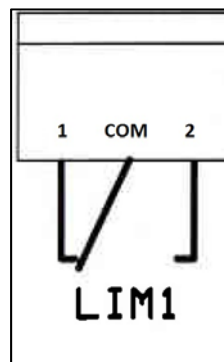
Range: ON or OFF

Default value: OFF

**ON** = when the measured value is below the LIM1 threshold value, the relay 1 is closed between COM and 1 (LED on the front panel is off).

**OFF** = when the measured value is below the LIM1 threshold value, the relay is closed between COM and 2 (LED on the front panel is on).

The figure below shows the relays with no current floating through the coils.



**4. Set on delay for limit 1**

On delay means the time before the alarm limit activates, when the LIM1 threshold value is override.  
 E.g. 0,0 sec = no on delay, the alarm limit activates when the LIM1 threshold value is override.  
 1,0 sec = 1,0 sec has to elapse before the alarm limit activates when the threshold value is override.

L	I	M	1														
O	n		D	l	y				0	.	0		s	e	c		

Range: 0,0 sec to 20 sec  
 Default value: 0,0 sec

**5. Set off delay for limit 1**

Off delay means the time after the alarm limit has been activated, until it releases the alarm again, when the measured value is above the LIM1 threshold value.  
 E.g. 0,0 sec = no off delay, the alarm limit releases when the measured value is above the LIM1 threshold value.  
 1,0 sec = 1,0 sec has to elapse before the alarm limit deactivates when the measured value is above the LIM1 threshold value.

L	I	M	1														
O	f	f		D	l	y			1	.	0		s	e	c		

Range: 0,0 sec to 20 sec  
 Default value: 1,0 sec

**6. Set limit 2 threshold value, overload detection**

 **Limit 2 shall be used for overload detection!**

L	I	M	2														
		L	i	m	i	t		s	e	t		1	1	0	%		

Range: -20% to 140%  
 Default value: 110%

### 7. Set on delay for limit 2

On delay means the time before the alarm limit activates, when the LIM2 threshold value is override.

E.g. 0,0 sec = no on delay, the alarm limit activates when the LIM2 threshold value is override.

1,0 sec = 1,0 sec has to elapse before the alarm limit activates, when the measured value is above the LIM2 threshold value.

L	I	M	2												
O	n		D	l	y				0	.	5		s	e	c

Range: 0,0 sec to 20 sec

Default value: 0,5 sec

### 8. Set off delay for limit 2

Off delay means the time after the alarm limit has been activated, until it releases the alarm again, when the measured value is below the LIM2 threshold value.

E.g. 0,0 sec = no off delay, the alarm limit releases when the measured value is below the LIM2 threshold value.

2,5 sec = 2,5 sec has to elapse before the alarm limit deactivates, when the measured value is below the LIM2 threshold value.

L	I	M	2												
O	f	f		D	l	y			2	.	5		s	e	c

Range: 0,0 sec to 20 sec

Default value: 2,5 sec

### 9. Set limit 2B

This alarm limit will triggering without on delay (catastrophe alarm limit). The limit 2B cannot be and shall not be set lower than LIM2.

L	I	M	2	B											
		L	i	m	i	t		s	e	t		1	2	0	%

Range: -20% to 140%

Default value: 120%

***Don't forget to save and quit the menu.***

## INSTALLATION – FORCE TRANSMITTER SETUP AND CALIBRATION



We recommend to first set all the parameters, in the “PARAMETER SETUP” menu.

Measuring mode (1Ch-Sensor or 2Ch-Sensor):

L	O	A	D	:		2	C	h	-	S	e	n	s	o	r
1	0	0	%	=			1	0	.	0		t	o	n	

Enter the “FORCE TRANSMITTER SETUP AND CALIBRATION” menu by pushing the **minus (-)** button and the **Enter** button at the same time for 3 seconds.

This display is shown for one second when entering the menu:

				S	Y	S	T	E	M						
			N	O	T		A	C	T	I	V	E	!		



The system is not active, which means the system will not activate the relay outputs according to the preset alarm limit thresholds. The relays are in “freeze” position.



This menu does not automatically return to “measure mode”, the operator must push the button MENU until the message “SYSTEM ACTIVE!” is shown in the display. Then, the system is in “measure mode” again.



Changed parameters must be confirmed (saved) with ENTER button. The following display is shown shortly when ENTER button is pushed:

x	x	x	x	x		x	x	x							
*	*	*	*		S	A	V	E	D		*	*	*	*	



If the parameters are changed but not saved, with the ENTER button, an alarm, “CRC-16 FAILURE”, will occur, when the menu is leaved. The system is put in “Failsafe state”, which means the relay outputs are in alarm position.

	C	R	C	-	1	6		F	A	I	L	U	R	E	
F	A	I	L	S	A	F	E		S	T	A	T	E		

To reset the “CRC-16 FAILURE” error: Push **PLUS (+)** and **ENTER** at the same time for 3 seconds.

Return to the “FORCE TRANSMITTER SETUP AND CALIBRATION” menu again, to verify that the parameters are set accordingly.



**Menu: “select redundant input” - FORCE TRANSMITTER SETUP AND CALIBRATION**

Select the force transmitter which is terminated to the 9:302C:

**ON:** a redundant force transmitter (2-Channels).

**OFF:** a force transmitter with 1-Channel. *Continue on page 20*

C	h	2		R	e	d	u	n	.	i	n	p	u	t
													O	N

**Menu: “select Ch1 – Ch2 difference” - FORCE TRANSMITTER SETUP AND CALIBRATION**

Set the value for maximum allowed difference, without triggering alarm, between the channel 1 and channel 2 from the redundant force transmitter:

Range: 1 – 99 %

Default value: 10%

C	h	1	-	C	h	2		D	I	F	F	%			
		L	i	m	i	t		s	e	t			1	0	%

**Menu: “select Ch2 delay” - FORCE TRANSMITTER SETUP AND CALIBRATION**

Set the value for maximum allowed delay, without triggering alarm when the difference value is exceeded:

Range: 5 – 60 Seconds

Default value: 10 Seconds.

C	H	A	N	N	E	L		2		D	L	Y			
D	e	l	a	y						1	0		s	e	c

**Menu: “calibration redundant input” - FORCE TRANSMITTER SETUP AND CALIBRATION**

Calibration menu. Use this menu when the system shall be calibrated. The relay outputs are in freeze position, to not disturb the calibration procedure.

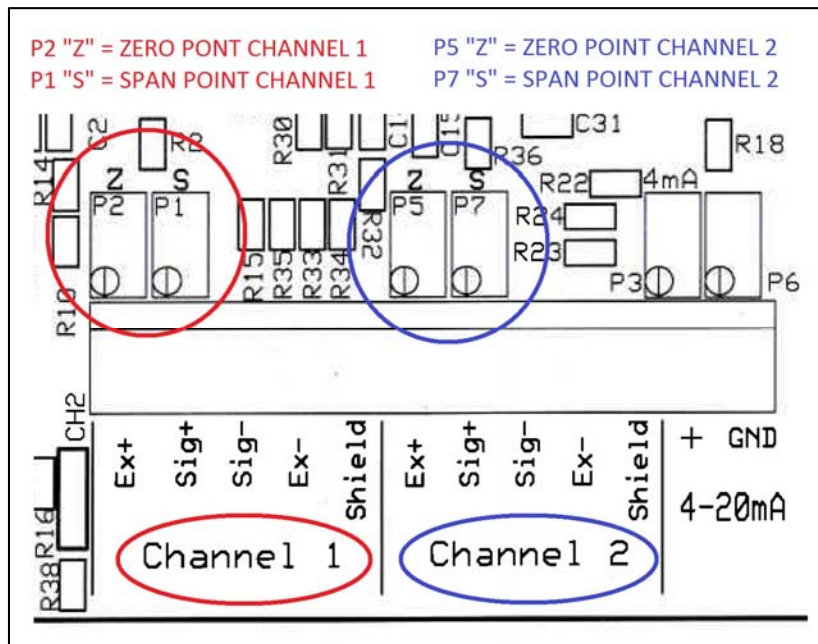
C	A	L	:			d	i	f	f			-	1	%	
C	1	:	-	1	5	%			C	2	:	+	1	5	%


The upper row in the display, shows the actual difference, between the channel 1 and channel 2 of the redundant force transmitter.

The lower row in the display, shows the input force values of the redundant force transmitter. C1 = channel 1 and C2 = channel 2.

*Continued on next page.*

The input values of the force transmitter, are calibrated with the potentiometers shown in the figure below.



 **Pay attention to follow the calibration procedure carefully! Wrong calibration may damage the crane. Make sure no personnel is exposed for dangerous situations when lifting/lowering the test weights.**

## CALIBRATION PROCEDURE FOR A REDUNDANT FORCE TRANSMITTER:

1. Turn the potentiometers P1 (SPAN) and P7 (SPAN) maximum clockwise (can be 5 – 10 turns).
2. Unload the hook to prepare for zero calibration.
3. Turn the potentiometers P2 (ZERO) and P5 (ZERO) until zero (0%) is shown in the display for both channels.
4. Load the hook with the test weight, we recommend to use minimum 70% of the test weight of the maximum capacity of the crane, to achieve high accuracy of the calibration.
5. Turn the potentiometers P1 (SPAN) and P7 (SPAN) to the corresponding percentage (%) value of the test weight.
6. Repeat step 2 to 5 several times, until the values are stable and the potentiometers do not need to be adjusted anymore.

E.g.

- The crane capacity is 10 ton (100%).
- The test weight is 8 ton in the hook, span calibration value is 80%.
- Unloaded hook, zero point calibration value is 0%.

**Hint to improve the turning of the potentiometers during the calibration, according to the example above with 8 ton test weight.**

When you are calibrating in step 6 (according to the calibration procedure), the zero point and the span point, can easier be found, if you are using this method:

The display shows C1:100% and C2:100% when you shall turn the potentiometers P1 (SPAN) and P7 (SPAN) to adjust the span point (to 80%).

Instead of turning the potentiometers to 80%, you turn them to 70%.

Explanation:

a) Target value 80% - actual value 100% = 20% difference.

The potentiometers P1 (SPAN) and P7 (SPAN) are adjusted to the half of the difference (20% / 2 = 10%) below the target value (80% - 10%) = 70%.

b) The hook is unloaded again, for zero point calibration, the display shows C1:-10% and C2:-10%

Target value 0% - actual value 10% = 10% difference.

The potentiometers P2 (ZERO) and P5 (ZERO) are adjusted to the half of the difference (10% / 2 = 5%) above the target value (0% - 10%) = 5%.

c) When the hook again is loaded with the test weight, the display shows C1:80% and C2:80% (target value).

d) The hook is unloaded again, the display shows C1:0% and C2:0% (target value).



**When calibration is done, exit the “FORCE TRANSMITTER SETUP AND CALIBRATION” menu by pushing MENU button.**

This display is shown for one second when the operator exit the “FORCE TRANSMITTER SETUP AND CALIBRATION” menu:

	S	Y	S	T	E	M			A	C	T	I	V	E	!

The system is now in measuring mode and the relay outputs will activate at preset alarm limit thresholds.

Measuring mode:

L	O	A	D	:		2	C	h	-	S	e	n	s	o	r
1	0	0	%		=			1	0	.	0		t	o	n

*Continued from page 17*

**Menu “select redundant input” - FORCE TRANSMITTER SETUP AND CALIBRATION**

Select “OFF” - according to the 1 channel force transmitter, which is terminated to the 9:302C:

**ON:** a redundant force transmitter (2-Channels).

**OFF:** a force transmitter with 1-channel.

C	h	2		R	e	d	u	n	.	i	n	p	u	t
												O	F	F

**Menu “calibration 1-Ch input” - FORCE TRANSMITTER SETUP AND CALIBRATION**

Calibration menu. Use this menu when the system shall be calibrated.

The relay outputs are in freeze position, to not disturb the calibration procedure.

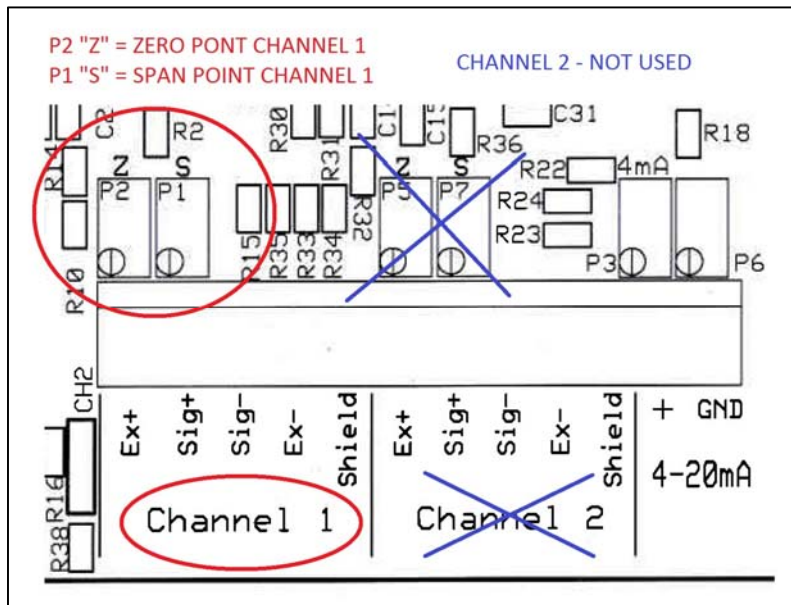


**We recommend to first set all the parameters, in the “PARAMETER SETUP” menu.**

C	a	l	i	b	r	a	t	i	o	n		o	f		
C	h	1	:			1	5	%	/				1	0	t

The upper row in the display indicates “calibration menu of 1-Ch force transmitter.

The lower row in the display, shows the input force value of the 1-Ch force transmitter and the maximum capacity, which is set in the “PARAMETER SETUP” menu. The input value of the 1-Ch force transmitter, is calibrated with the potentiometers shown in the figure below.





**Pay attention to follow the calibration procedure carefully! Wrong calibration may damage the crane. Make sure no personnel is exposed for dangerous situations when lifting/lowering the test weights.**

## **CALIBRATION PROCEDURE FOR ONE CHANNEL FORCE TRANSMITTER:**

1. Turn the potentiometer P1 (SPAN) maximum clockwise (can be 5 – 10 turns).
2. Unload the hook to prepare for zero calibration.
3. Turn the potentiometer P2 (ZERO) until zero (0%) is shown in the display.
4. Load the hook with the test weight, we recommend to use minimum 70% of the test weight of the maximum capacity of the crane, to achieve high accuracy of the calibration.
5. Turn the potentiometer P1 (SPAN) to the corresponding percentage (%) value of the test weight.
6. Repeat step 2 to 5 several times, until the values are stable and the potentiometers do not need to be adjusted anymore.

E.g.

- The crane capacity is 10 ton (100%).
- The test weight is 8 ton in the hook, span calibration value is 80%.
- Unloaded hook, zero point calibration value is 0%.

### **Hint to improve the turning of the potentiometers during the calibration, according to the example above with 8 ton test weight.**

When you are calibrating in step 6 (according to the calibration procedure), the zero point and the span point, can easier be found, if you are using this method:

The display shows Ch1:100% when you shall turn the potentiometer P1 (SPAN) to adjust the span point (to 80%).

Instead of turning the potentiometer to 80%, you turn it to 70%.

Explanation:

a) Target value 80% - actual value 100% = 20% difference.

The potentiometer P1 (SPAN) is adjusted to the half of the difference ( $20\% / 2 = 10\%$ ) below the target value ( $80\% - 10\% = 70\%$ ).

b) The hook is unloaded again, for zero point calibration, the display shows Ch1:-10%

Target value 0% - actual value 10% = 10% difference.

The potentiometer P2 (ZERO) is adjusted to the half of the difference ( $10\% / 2 = 5\%$ ) above the target value ( $0\% - 10\% = 5\%$ ).

c) When the hook again is loaded with the test weight, the display shows Ch1:80% (target value).

d) The hook is unloaded again, the display shows Ch1:0% (target value).



**When calibration is done, exit the “FORCE TRANSMITTER SETUP AND CALIBRATION” menu by pushing MENU button.**

This display is shown for one second when the operator exit the “FORCE TRANSMITTER SETUP AND CALIBRATION” menu:

	S	Y	S	T	E	M			A	C	T	I	V	E	!

The system is now in measuring mode and the relay outputs will activate at preset alarm limit thresholds.

Measuring mode:

L	O	A	D	:		1	C	h	-	S	e	n	s	o	r
1	0	0	%	=				1	0	.	0		t	o	n

## ADJUSTMENTS & TEST OF PERFORMANCE

Determine the limit thresholds for the relay outputs which is required for the crane. By considering the delay functions of the limit thresholds, the best performance of the crane can be achieved. Test each relay function to ensure proper function.

## MAINTENANCE

9:302C is designed to be maintenance free. However, according to local regulations, a proof lift shall carried out on a regular basis. In case of error in the 9:302C unit, the relay output will prevent the crane to handle the lifting function.

In case of cleaning the equipment, this should be done, by gently wiping it off with a dry or damp cloth.

## TROUBLESHOOTING

When the error messages is displayed, the system is put in FAILSAFE STATE, which means all three output relays are in alarm position.

### 1. Error message:

L	O	A	D	:				1	5	0	%			
F	A	I	L	S	A	F	E			S	T	A	T	E

#### Cause:

1. Force transmitter overloaded >150% .
2. Cable interruption Sig+.
3. Force transmitter failure.

#### Solution:

The error message will automatic reset when the load is <150% or cable is repaired.

1. Check calibration.
2. Check cable for damage and cable connection.
3. Check force transmitter.

**2. Error message:**

L	O	A	D	:			-	5	0	%				
F	A	I	L	S	A	F	E		S	T	A	T	E	

**Cause:**

1. Force transmitter overloaded with negative signal <50%.
2. Cable interruption Sig+.
3. Force transmitter failure.

**Solution:**

The error message will automatic reset when the load is >50% or cable is repaired.

1. Check calibration.
2. Check cable for damage and cable connection.
3. Check force transmitter.

**3. Error message:**

L	O	A	D	C	E	L	L		F	A	I	L	U	R	E
F	A	I	L	S	A	F	E		S	T	A	T	E		

**Cause:**

1. Cable interruption Ex+
2. Cable interruption Ex-
3. Force transmitter failure

**Solution:**

The error message must be reset by pushing **PLUS (+)** and **ENTER** button in 3 seconds.

1. Check cable for damage and cable connection.
2. Check cable for damage and cable connection.
3. Check force transmitter.

**4. Error message:**

C	1		C	2		M	I	S	S	M	A	T	C	H	!
F	A	I	L	S	A	F	E		S	T	A	T	E		

**Cause:**

1. One channel of the redundant force transmitter is broken.
2. Cable interruption Sig+ of channel 2.
3. Cable interruption Sig- of channel 2.
4. The calibration of the redundant force transmitter is faulty.

**Solution:**

The error message must be reset by pushing **PLUS (+)** and **ENTER** button in 3 seconds.

1. Check the force transmitter.
2. Check cable for damage and cable connection.
3. Check cable for damage and cable connection.
4. Check calibration.

**5. Error message:**

	C	R	C	-	1	6		F	A	I	L	U	R	E	
F	A	I	L	S	A	F	E		S	T	A	T	E		

**Cause:**

1. In menu: "FORCE TRANSMITTER SETUP AND CALIBRATION". If the menu is exit and the parameters are changed but not saved, with the ENTER button.
2. In menu: "PARAMETER SETUP". If the code is entered AND the complete menu sequence is exit without saving the changed parameters, with the ENTER button.
3. In menu: "PARAMETER SETUP". If the code is entered AND the parameters are changed and saved with ENTER button, but the menu is NOT exit with the complete menu sequence.
4. Internal Eeprom error.
5. Internal RAM error.
6. Relay 2 output feedback error

**Solution:**

The error message must be reset by pushing **PLUS (+)** and **ENTER** button in 3 seconds.

1. Check the parameter settings.
  2. Check the parameter settings.
  3. Check the parameter settings.
- Cause 4, 5 and 6: The error message is not possible to reset. Send unit for service.



## SUMMARY OF CODES

**MENU:** "PARAMETER SETUP"

**CODE:** **MENU** button and **Enter** button pushed at the same time for 3 seconds.

**MENU:** "FORCE TRANSMITTER SETUP AND CALIBRATION"

**CODE:** **minus (-)** button and **Enter** button pushed at the same time for 3 seconds.

Reset of error messages: **plus (+)** button and **Enter** button pushed at the same time for 3 seconds.

## IDENTIFICATION AND SPARE PARTS

Identification: 9:302C

Spare part unit part no.: 301968

## REPLACEMENT OF PARTS AND DISPOSAL

If a failure should occur, it is recommended to send back the unit to the manufacturer for repair.  
Risk of electric shock! Make sure that connections to the relays are isolated, and the mains supply is disconnected.

After repair/service, and reconnection of mains supply, perform the steps in chapter "INSTALLATION" to verify proper function of the complete system. When proper function is verified, the system can be used again.

Replaced and disposed parts can be sent to Gigasense AB for destruction.

## RECOMMENDED SPARE PARTS

The 9:302C overload protection system does not require any spare parts.

In a sensitive application, where downtime is not acceptable, we recommend to keep one unit in stock for quick replacement if needed.

## CE-CERTIFICATION

Hereby, Gigasense AB, declares that this equipment is in compliance with the essential requirements.

## CONTACT

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