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DIVERSE YACHTS

Performance Racing Technology

LOADSENSE HANDBOOK

Installation and Set-up manual

(HLA version)

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1. Load Cell Installation

The load cell (pin) is a totally sealed unit, constructed from the most suitable stainless steels available to withstand the loads and conditions of the marine environment. To ensure a long life for the load cell, careful installation is recommended especially with regard to the signal output cable and protective hose.

Standard Pins

Install the Shear Monitoring Pin (SMP) so that the pin will be at 90° to the load path, as shown in the sketch (Fig 1.)

The SMP should be a close fit in its associated holes.

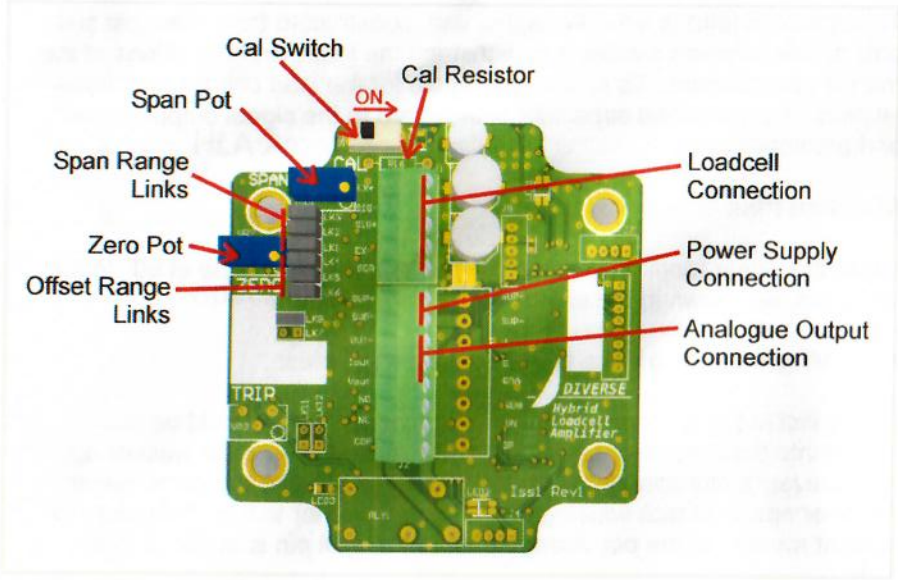
Finally install the orientation washer, an accurate hole should be machined into the outside cheek of the chain plate to locate the washer pin. Alternatively a slot can be machined (Fig 1.) to achieve the same result. A further option of tack welding the reversed washer to the chain plate to prevent rotation of the pin. Always ensure the split pin is at 90° to load path.

Custom Pins: Install as per pin design

Route the output cable from the cell to the deck carefully to prevent it from being snagged or chaffed in service.

For forestay load cells it is recommended to take the cable over the bow an then into the hull so as to keep the cable safe from damage. The load-cell is supplied with a cable protection hose and should be measured for length (with a suitable loop for load cell flexing) and cut before feeding over the cable. Push and twist the hose into the hull through a 14mm hole and seal as necessary. The route of the cable, below should be kept away from any high power transmitting cables such as those associated with radar and radio.

2. Hybrid Loadcell Amplifier (HLA)



Connections

Terminals	Colour	Function
EX +	RED	Load cell + supply
SIG -	YELLOW	Load cell -signal
SIG +	GREEN	Load cell + signal
EX -	BLUE	Load Cell - supply
SCR	BLACK	Load Cell cable screen
SUP +	RED	12-24Vdc
SUP -	BLUE	0 V
Terminals	**4 – 20mA output**	
OUT -	RETURN	
I out	4 – 20mA current output	
Terminals	**0 – 5V output**	
OUT -	0 Vdc	
V out	+ 5Vdc	

Coarse Span links

Link	Span range
LK1 + LK3	0.5 – 1.8 mV/V
LK2	1.5 – 3.4 mV/V
No links	3.2 – 5.0 mV/V

Coarse Zero Links

Link	Max offset mV/V
No links	
LK4	0.1
LK5	0.2
LK6	0.4

3. Setting up

Make sure the CAL switch is set to OFF (slide to the left)

With no mechanical load on the load cell, switch the supply voltage to the amplifier and measure the output on terminals **OUT-** & **V out** (or **I out** for 4 -20mA option). Adjust the ZERO potentiometer (pot) until 0.00V or 4mA (depending on voltage or current output option) is read.

Switch the CAL on (to the right) and note the output that should match the figure found on the calibration certificate (HLA CAL Voltage). Adjust the SPAN pot, if necessary, to achieve that figure. Switch the CAL off and re-check the zero point. Repeat the process as necessary. Leave the CAL switch off in use. The amplifier is now set up.

The function of the CAL switch

For information the CAL switch shunts a precision 100K ohm resistor across one arm of the strain gauge bridge, within the load pin, and has the effect of simulating a load on the load pin. The same value 100K resistor is used at calibration of the pin and a load reading is noted on the certificate as a Cal equivalent.

4. Specification

Power Supply	12-24V DC Nominal (10-31.5V Max Range)
Load Cell Input	120-1000 ohm Full Bridge 4 wire connection
Excitation Voltage	5V Nominal (test EX+ and EX On load cell input)
Input Range	0.5 – 5 mV/V for FSD 3 ranges, Jumper link selectable, approx 0.5-1.8, 1.5-3.5 & 3.2-5 mV/V FSD
Zero Offset	up to +/- 1.9mV/V (on 350R bridge), in 4 ranges
Analogue Output	0-5V or 4-20mA

Load Cell function test

Remove wiring from the HLA amplifier and test resistances which should be generally as follows:

RED to BLUE	350 ohms (this may vary slightly)
YELLOW to GREEN	350 ohms
RED to YELLOW	262.5 ohms
RED to GREEN	262.5 ohms
BLUE to YELLOW	262.5 ohms
BLUE to GREEN	262.5 ohms

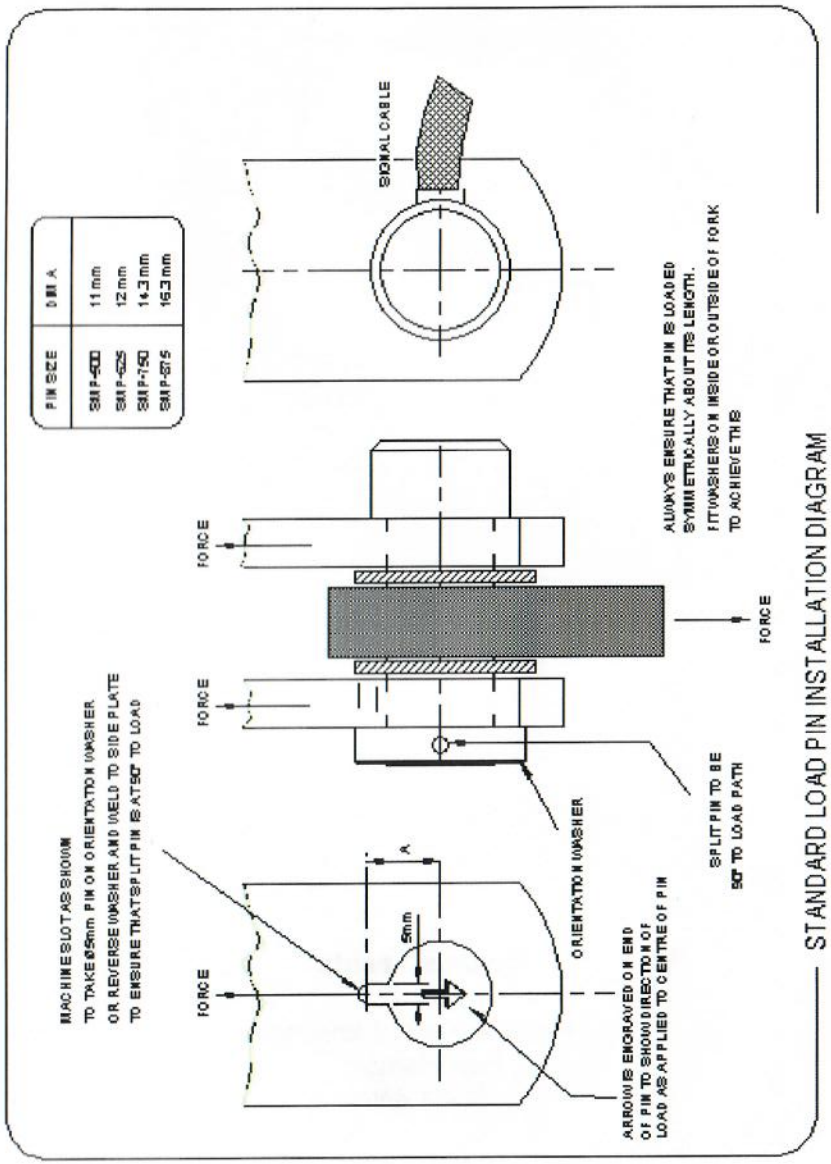
Test the above wires to the earth of the load pin with no more than 50V insulation test. All cores and the screen (black wire) should be isolated from earth.

Amplifier function test

Reconnect the load cell to the HLA amplifier and perform the following tests:

1. Ex+ to EX– should be approximately 5Vdc
2. With no load applied there should be 0V dc on OUT– to V out
3. Switch the CAL on and OUT– to V out will read CAL equivalent

Fig 1.



Calibration Certificate

Load Cell Type :	3986	Connections:	RED	+ Supply
Load Cell Serial No. :	99905		BLUE	- Supply
Date :	07/06/2013		GREEN	+ Signal
Proof Load (tonnes):	4.8		YELLOW	- Signal
Amplifier :	HLA: 11154		BLACK	cable screen

Applied Load tonnes	Reading 1 mV/V	Reading 2 mV/V	BSL mV/V	% error full range
0	0	0	0	0
0.80	0.422	0.420	0.425	-0.2%
1.60	0.846	0.845	0.850	-0.2%
2.40	1.275	1.271	1.274	-0.1%
3.20	1.706	1.700	1.699	0.1%
4.00	2.125	2.120	2.124	-0.1%

B&G Cal
-2
0
6.05

CAL resistor (shunt BLUE / YELLOW)	100	K Ohms
CAL reading	0.881	mV/V
CAL equivalent	1.66	tonnes
CAL equivalent	3.66	Klbf (lbf x 1000)
CAL equivalent	1.73	Vdc (LA3 & HLA amplifiers)

All readings taken are traceable to national standards

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