

BRIDGE-BOY 1 & 3 RELAYS

Single hoisting



Different references:

- BRIDGE-BOY-48VAC-1R BB 48 VAC IP54 CE 1 relay
+ Option ALIM-115VAC
- BRIDGE-BOY-230VAC-1R BB 230 VAC IP54 CE 1 relay
- BRIDGE-BOY-48VAC-3R BB 48 VAC IP54 CE 3 relays
+ Option ALIM-115VAC
- BRIDGE-BOY-230VAC-3R BB 230 VAC IP54 CE 3 relays

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1. GENERAL

These instructions describe the procedure to be followed for installing and adjusting the BRIDGE-BOY overload protection electronic system in cases where it is applied to a single hoisting device (no summation).

If you are already familiar with this procedure, you may go straight to chapter 4.

1.1. Introduction

The BRIDGE-BOY limitation systems must absolutely be installed in a metal casing connected with the earth. In the case of a very disturbed electric line, the supply to the BRIDGE-BOY must be filtered through a Schaffner filter.

Always make sure these adjustments are done with the hook at the same height in order to be free of effects of the weight of the cables.

The zero-point should always be adjusted after any lowering and the sensitivity adjustments, after lifting, to avoid all effects of friction in the pulley-blocks.

The BRIDGE-BOY is an auto-supervised device. In case of a breakage, a cut or short-circuit of the supply-cable, the transducer or the measuring cable, the device immediately commutes to security mode.

1.2. Principle

The BRIDGE-BOY -1R is equipped with one changeover relays. When switched off, the relay is in «rest» position. The BRIDGE-BOY -3R is equipped with three changeover relays.

When the BRIDGE-BOY-1R is switched on and the load applied is lower than the thresholds, the relays are in «working» mode and contact is made between terminals 14 and 15 (SP 1). The led on the front is green. If the applied load is greater than the threshold, then the relay returns to the "rest" position and the led becomes red.

Once a threshold has been exceeded, the load should be reduced by at least 20% of the nominal capacity of the bridge, so the alarm is deactivated (hysteresis). If specified in the order, the value of the hysteresis can be reduced for example in order to manage a low threshold for the detection of cable-slack. For the BRIDGE-BOY-3R, the 3d threshold is in standard configured for the detection of cable-slack.

Each threshold has a time delay, in order to avoid the alarm going on in case of occasional overloads due to dynamic effects.

1.3. Exceptional cases

There are two variations for the use of the BRIDGE-BOY:

- The SUPPLEMENTARY BRIDGE-BOY. In case that more than 3 threshold is needed.
- The SUMMING BRIDGE-BOY. In case of the need to limit the load of a sum of two hoisting devices.

Documents for these two variations are available at SENSY S.A.





2. INSTALLATION AND ADJUSTMENTS


Install the force transducer. In case of load-pin the arrow has to be pointing in the direction of the force applied on the central part.

Put the system power on approximately 15 minutes before beginning any adjustment. Lift several times the nominal load in order to stabilize the system mechanically.

2.1. Short calibration procedure

In case of urgency and if the calibration load is equal to the maximum load (usually 110 % of the nominal load) it is possible to calibrate the BRIDGE-BOY with following the short calibration procedure here below:

- Put the load on the ground.
- Check that the SP1 led is green. If it is red, turn the potentiometer Z clockwise  so that this led becomes green.
- Turn the SP1 potentiometer 20 turns in the clockwise direction  (maximum set-point).
- Turn the D1 potentiometer 20 turns in the anti-clockwise direction  (minimum delay)
- Lift up the load.
- Turn slowly the SP1 potentiometer in the anti-clockwise direction  till the SP1 led becomes red.

- Put down the load and lift it up again to check that the limitation work properly.
- If, when lifting smaller loads it appears that the BRIDGE-BOY trigger because of the presence of dynamical forces, increase the value of the delay by turning the potentiometer D1 clockwise . This action has to be made carefully because it creates a delay between the detection of the force and the commutation of the relay.

For a better calibration and to know the adjustment parameters, it is better to follow the full calibration procedure here after:

2.2. Full calibration procedure (recommended)

2.2.1. Transducer supply voltage

The measurements must be made on the terminals and not on the screw heads.

Measure the voltage at terminals 3 (-) and 4 (+) of the terminal box. Using the potentiometer I, bring the voltage to 8 volts.

2.2.2. Zero

The zero-point and sensitivity of the BRIDGE-BOY are adjusted using the output voltage measured on the terminals 6(-) and 8(+). The test point "common (0 V)" on the front at the left side just above the terminals of the power supply is equivalent to the terminal nr 6 (ground).

Unload the hook and adjust the output voltage to 0 Volt, using the potentiometer Z. If an indicator has been installed, activate the tare and the display will indicate «zero».

2.2.3. Sensitivity (span)

Load the system with a calibrated mass as close as possible (75% minimum) to the nominal load of the hoisting system and bring the output voltage (via the potentiometer S) to the value V_s , calculated using one of the following formulas:
If your load is 110%, the voltage between 6(-) and 8(+) will be adjust at 8 V.

By default:

$$V_s = \boxed{8\text{ V}} \times \frac{\text{Cal. mass}}{\text{Nom. load} \times 1,1} \quad \boxed{}$$

$$V_s = \boxed{7,27\text{ V}} \times \frac{\text{Cal. mass}}{\text{Nom. load}} \quad \boxed{}$$

Your particular case:

$$V_s = \boxed{} \text{ V} \times \frac{\text{Cal. mass}}{\text{Nom. load} \times 1,1} \quad \boxed{}$$

$$V_s = \boxed{} \text{ V} \times \frac{\text{Cal. mass}}{\text{Nom. load}} \quad \boxed{}$$

- If a pre-programmed indicator is connected to the analogue output of the BRIDGE-BOY, it should display the hoisted load.
- Put down the load. If the voltage is not equal to zero redo operation 2.2.2 and 2.2.3.

Example of particular case: For an overhead crane with a nominal load of 25 tons and a calibrated mass of 18.6 tons

$$V_s = 7.27\text{ V} * \frac{18.6\text{ t}}{25\text{ t}} = 5.4\text{ V}$$

2.2.4. Adjustment of the set-point(s)

The voltage corresponding to the set-point(s) are measured between the test point "common" 0V (-) and the set-points SP1 (SP2, SP3) (+) situated on the front side. This voltage(s) should be adjusted by their respective potentiometer(s) SP1 (SP2, SP3).

The set-point(s) will be adjusted following the same rules than the sensitivity.

For a set-point of 110% of the nominal capacity, the voltage should be set at 8 V and for a set-point of 80%, the voltage will be adjusted at:

$$V_s = 8 V * \frac{80\%}{110\%} = 5.81 V$$

On the BRIDGE-BOY-3R is set-point 3 dedicated by default to slack cable detection (reverse operation-hysteresis = 0) and only 1 set point is adjusted at 8 V.

2.2.5. Adjustment of the delay of the set-point(s)

Turn the delay potentiometer(s) D1, (D2, D3) situated on the front side 20 turns anti-clockwise ↺ (minimum delay).

Lift a weight equal to the nominal load of the hoisting device (100%).

In case the BRIDGE-BOY detects a dynamic overload because of movements, turn the delay potentiometer D1 (D2, D3) clockwise ↻, in order to increase the time delay.

This action has to be made carefully because it creates a delay between the detection of the force and the commutation of the relay.

Warning: a too long delay can lead to late detection of overload and thus damage the lifting equipment.

Remark: The leds are green in the safe situation. They become red in case of the corresponding set-point is in fault situation. They are white in the transient period when the set-point is reached but the relay not yet (des)activated. This allows to check the efficiency of the delay.

The BRIDGE-BOY has a test button on the front side that allows you to commute to security mode.

3. PROBLEMS AND SOLUTIONS

3.1. The adjustment on potentiometer I has no influence on the value of the transducer power supply

- If this voltage is $\pm 13 V$, the supply circuit of the transducer has been cut off.
- Measure the resistance of the transducer between the brown and yellow cables: it should be of $380 \Omega \pm 30 \Omega$.
- Check the connections.
- If you have any further problems, contact your dealer.

3.2. Impossible to bring the zero signal to 0 V

- Measure the output voltage of the transducer (mV) between the terminals 1 (+) and 2 (-) and check it increases when some load is applied.
- Too big load when empty. Modify the adjustment parameters by default and redo any necessary calculations eventually with your dealer.
- If all else fails, contact your dealer

3.3. Impossible to adjust the signal to 8 V for a load of 110%

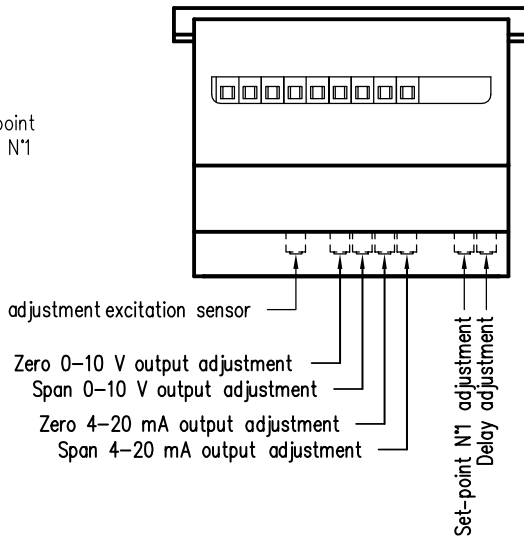
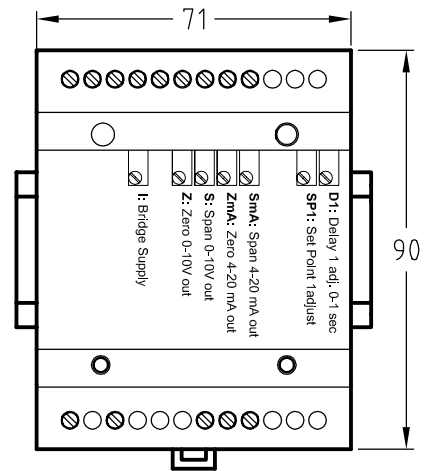
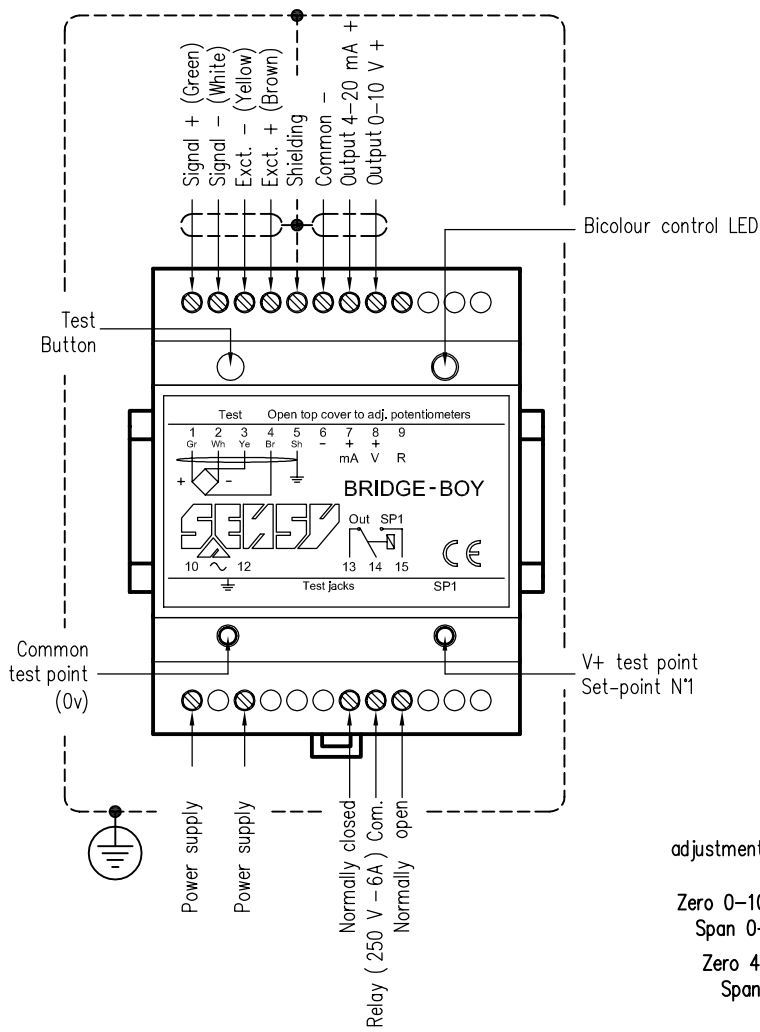
- The output voltage remains too high.
Reduce the power supply of the transducer without going below 6 V.
Re-adjust the zero point.
- The voltage at 110% remains lower than 8 V, choose a lower value for the set-points at 110% (ex: 6 V) and calculate the set-points adjustments in function of this new value.
- If all else fails, contact your dealer.

4. SPECIFICATIONS

Power supply: to be specified at the order see front of the BRIDGE-BOY	110/230 VAC	230 VAC $\pm 10\%$ 115 VAC $\pm 10\%$
	48/110 VAC	110 VAC $\pm 10\%$ 48 VAC $\pm 10\%$
Adjustable current generator	10...28 mA	
Maximum voltage	11 V	
Voltage output	0-10 V (max load 4 mA)	
Current output	4-20 mA (max load 10 V)	
Isolation	1,5 kV Alternative / 500 V Continuous	
Zero input voltage	From -1.2 to 4.5 mV	
Full scale	From 9 to 25 mV	
<u>Alarms</u>		
Adjustable set-point	From 0 to 100% (0...10 V)	
Hysteresis	Definable on order (de 0 à 20%)	
Adjustable delay	From 60 ms to 1s	
<u>Accuracy</u>		
Maximum error	< 0.5%	
Supply current	< 0.1% / 10°C	
Output signal	< 0.1% / 10°C	
Set-point	< 0.2% / 10°C	
Influence from supply voltage	< 0.2% / 10%	
<u>General</u>		
Relay contact data	Changeover (250 VAC/6 A)	
Temperature range	- 20 à +60°C	
Sealing	IP55	
Weight	0.8 kg	
Terminals	BRIDGE-BOY-1R: 14 terminals BRIDGE-BOY-3R: 20 terminals	

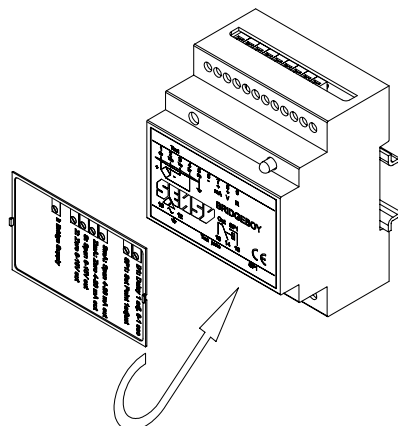
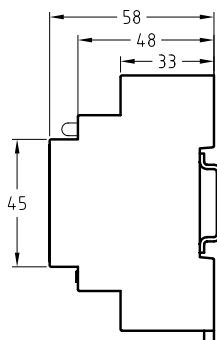
5. INSTALLATION AND ADJUSTMENT DIAGRAMS

BRIDGE-BOY-1R > STANDARD DIMENSIONS



Dimensions in mm

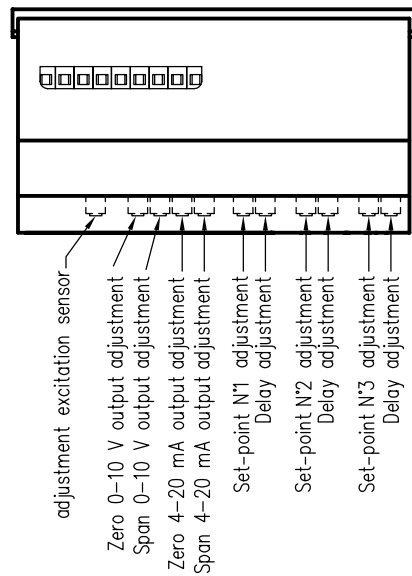
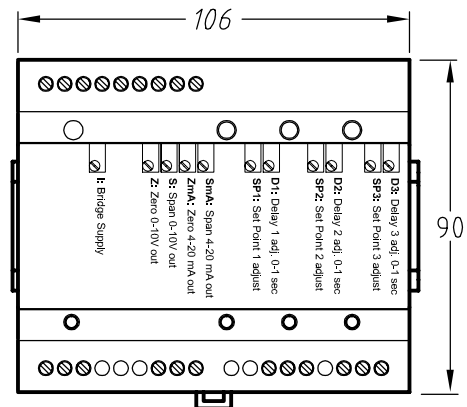
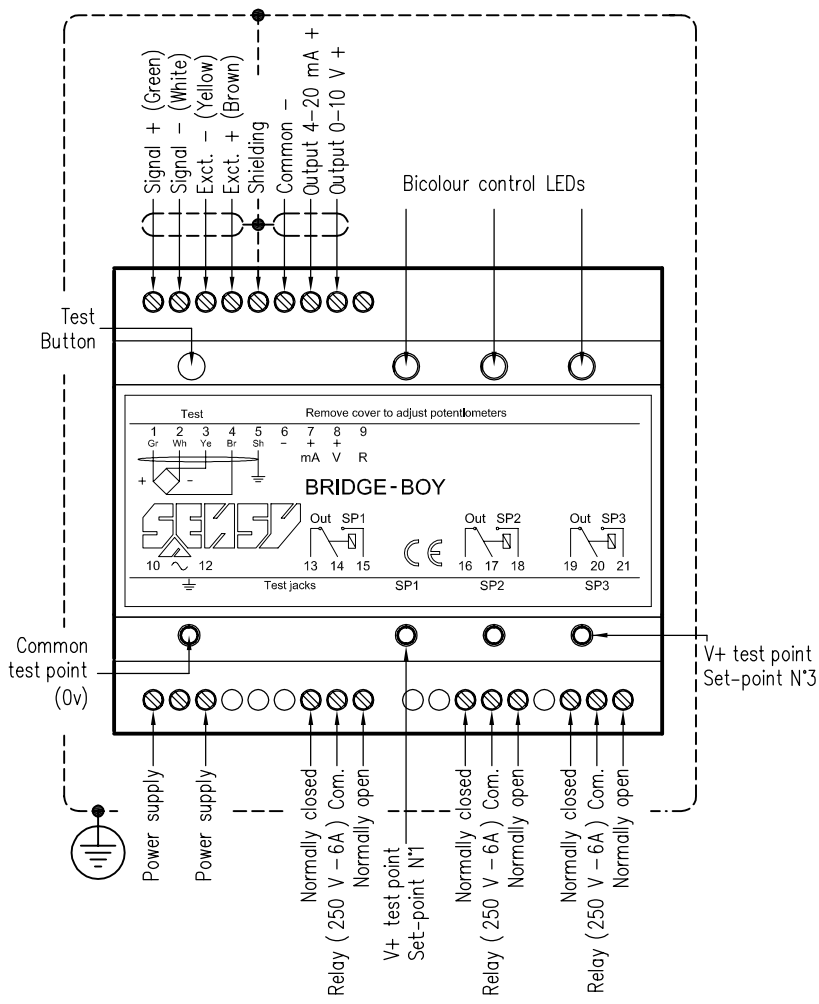
Other views



Terminals

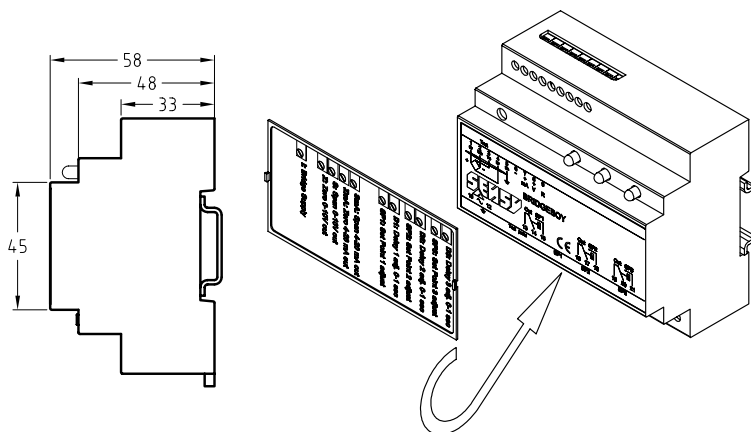
See drawing

BRIDGE-BOY-3R > STANDARD DIMENSIONS



Dimensions in mm

Other views



Terminals

See drawing

