

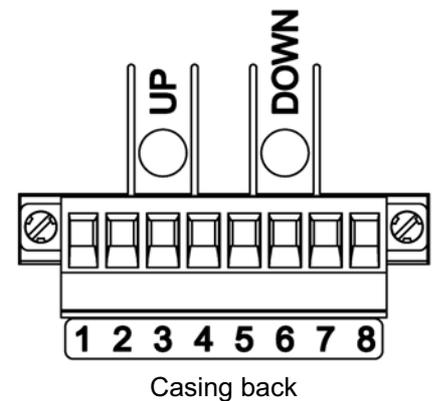


Panel cut-out dimensions

Housing type	Panel cut-out	Permissible deviation
LSSM3-072	square: 68 mm x 68 mm	+ 0.7 mm
LSSM3-096	square: 92 mm x 92 mm	+ 0.8 mm
LSSM3-144	square: 138 mm x 138 mm	+ 1.0 mm
LSSM3-060	round: diameter 61 mm	+ 0.5 mm
LSSM3-080	round: diameter 81 mm	+ 0.5 mm
LSSM3-100	round: diameter 101 mm	+ 0.5 mm
LSSM3-130	round: diameter 131 mm	+ 0.5 mm

Pin-out for the backside connector plug

Pin no.	Description
1	Positive supply voltage
2	Negative supply voltage
3	Illumination control input 1 (either polarity)
4	Illumination control input 2 (either polarity)
5	Auxiliary positive connection
6	Auxiliary negative connection
7	Positive signal input
8	Negative signal input



Pushbutton operations

Two pushbuttons at the rear of the instrument are used to set various parameters. The adjustment direction for the buttons is stamped into the housing. The left button (as viewed from the front) is marked "DOWN", the right button is marked "UP". These buttons can be pressed briefly (to adjust by a single increment) or long (continuous adjustment). The instrument's illumination will begin to flash on and off to alert the user that the given adjustment limit has been reached.

These buttons can be used to reach different "setting levels". Each level allows the setting of a different parameter (if they are implemented). The following conditions must be observed:

- In the normal state (instrument on) the level "zero" is active.
- Other setting levels can be reached by pressing and holding both buttons at the same time. After five seconds the illumination will flash briefly, after another five seconds the illumination will flash a second time, after a total of 15 seconds a third flash, and so on.
The point in time when the buttons are released determines the instrument's setting level. If the buttons are released after the first flash, the instrument is in setting level "one", after the second flash it is in setting level "two" and so forth.
- If no setting is made after releasing the buttons, the instrument will return to setting level zero after ten seconds. The illumination is again flashed briefly to indicate this state. In this case, the parameter that had been selected will not be adjusted.
- However, once a setting level has been selected, the given parameter can be adjusted by pressing one of the buttons. Each activating of an adjustment button postpones the return to level "zero" by another ten seconds. This permits the setting of the selected level to be made without haste. Only when the setting is finished and no button is pressed for ten seconds does the instrument return to level "zero" again. The change to the adjusted parameter is then stored permanently.

Returning the instrument to factory settings

There is also a technique by which the changes to all setting levels can be reset to the factory default settings. To do this, just after switching the instrument on and before its initialisation is finished, press both buttons and hold them down until the illumination flashes briefly.

Assignment of setting levels to available functions

Level 0: This level is always assigned to the regulation of instrument illumination brightness because this parameter is available during normal operation. The factory default for illumination brightness is 100 %.

Level 1: This level is always the separate setting for illumination strength of the illuminated pointer, presuming the instrument has this feature. The factory default for illuminated pointer illumination strength is 100 %.

Level 2: ... and additional levels.

The regulation and settings for other special functions are implemented beginning with this level. The explanations for these can be found in the description of the respective special function.

Special functions

Optionally, LSSM3 standard instruments may include the following described special functions.

Line compensation

Line compensation can be carried out with the rear-side buttons if this special function is available. The instrument's reading can be changed by as much as ± 10 % with this setting.

When available, line compensation is built into the instrument's setting level 2 (refer also to title sections "Button operations" and "Assignment of setting levels to available functions").

Attention: After performing line compensation the instrument's factory default for compensation is no longer present, i.e. the instrument no longer shows the correct value.

However, the factory default can be reinstated (see above).

Min/max display

An instrument with the min/max display feature tracks the measured signal's fluctuations and stores the highest and lowest values. Critical values that, for example, occur during the absence of monitoring personnel, can therefore be recalled later on.

Stored values can be called up by means of an external push button on connecting power supply to auxiliary input.

- Pressing the external push button once will call up the minimum value for five seconds.
- Pressing the external push button twice will call up the maximum value for five seconds.
- Pressing the external push button for at least 5 seconds will delete the stored min/max values.

Remarks:

- While the instrument is displaying a minimum or maximum value it will flash its illumination to indicate it is not displaying the current actual value.
- Illumination also flashes when the min/max data is being deleted. Press the buttons until the illumination's flashing stops, only then are the data deleted.
- During a period when a minimum or maximum display is ongoing, the min/max data cannot be deleted.
- The min/max data are lost when the instrument is switched off.

Limit switch output

This type of instrument can switch its auxiliary connection as an output and thereby serve as a limit switch. This feature can be used to switch an external device (e.g. a signal beeper or signalling device, etc) when a certain instrument value has been reached or, alternatively, lies within a certain instrument value range.

The output can either be switched with a current-limited semiconductor relay or a normal mechanical mini relay.

Signal or alarm LED

Such instruments are equipped with an additional LED on the scale. This LED can assume the states "off", "on" and "blinking" for use in the following manner:

- it can be coupled to certain measurement values, e.g. excessive speed or over-temperature etc.
- it can be correlated to measurement ranges, e.g. blinking within the red range, or blinking outside the green range or similar.
- it can also be controlled by an external signal applied to the instrument's auxiliary input or, if desired, by the auxiliary input and the measured value, i.e. both together.
- another possibility is to have the instrument take notice of a onetime reached "warning range" and have the LED indicate that the condition occurred, even though it has since gone away. Only a deliberate reset signal applied to the auxiliary input (24 V connected via a pushbutton switch) will then shut off the LED.
- Last but not least, all of the aforementioned options can be combined freely.

Blinking pointer

All of the aforementioned options described for a signal/alarm LED can also be used for an illuminated pointer. The illuminated pointer starts to blink when a signal condition is present. Signal LED and pointer blinking can also be freely used in combination. For example, the pointer could be coupled to a measurement value while the signal LED is controlled by the auxiliary input for another purpose.

Motor with right stop

Such instruments are delivered as left turning devices with a right stop limit.

Technical data

Electr. connections	
Supply voltage	18 V...36 V DC at 2 W max power consumption; other voltages on request.
Analog input signals	0...10V _{DC} , 2...10V _{DC} Ri = 29 KOhm; 0...20mA _{DC} , 4...20mA _{DC} Ri = 121 Ohm -10V _{DC} ...+10V _{DC} Ri = 26 KOhm; -20mA _{DC} ...+20mA _{DC} Ri = 59 Ohm
Frequency signal input	Frequency Range: 0,2Hz to 140KHz Scale end value >10Hz arbitrarily Waveform: any AC Voltages: 200mV _{pp} to 400V _{pp} Positive Frequency Signals: low level ≤ 4V; high level ≥ 6,5V, max. 200V _p Internal Resistance: for all signals ≥ 220 KOhm Possible sensor types: Active Sensors: with „open collector“ as PNP or NPN output or with push-pull output Passive Sensors: inductive-magnetic principle Tacho Generators: with AC output
Input for resistive sensors	PT100 / PT1000; 2-, 3- or 4-wires: -30°C...600°C; I _{MEAS} = 1,6mA / 0,17mA NTC: H1: 40°C...120°C; H2: 5°C...70°C; H3: 114°C...200°C
Illumination regulation input	Ri about 17 KOhm; for conventional 24 V PWM dimmer (positive or negative regulator) or 0...24 V _{DC} (this input is not polarity sensitive).
Auxiliary connection	Binary connection. Selectable as input or output as desired. Input: binary switched input; 0V = Low; 12V/24V = High, or analog input for PT100 / PT1000 three-or four-wire connection Output: switch contact as limit switch. Two versions selectable. Semiconductor Relay switching capability: I _{max} = 100 mA; U _{max} = 60 V _{DC} Magnetic Contact Relay. switching capability: I _{max} = 500 mA; U _{max} = 60 V _{DC}
Accuracy	
Accuracy class	Better than 0.5 % with respect to full scale value per EN60051-1 and IEC60051-1
Measured signal resolution	10 bit
Stepper motor resolution	twelve motor steps per angle degree
Gear backlash	typical 0.3 degree; static and dynamic gear backlash correction via software
Ambient influences	
EMC	Fulfils all requirements of the conventional ship classifications and the railway standard
Vibration and shock	vibration stability up to 4 g, shock resistant up to 5g at 30ms and up to 10 g at 18 ms
Ingress protection	at the housing front, IP66 and IP67 per DIN EN60529
Moisture	≤ 95 % relative humidity at 55 °C per IEC60068-2-30
Insulation voltage	1000 V DC between all electrical inputs and outputs
Fire safety class	V0
Operating temperature	-25 °C to +70 °C per IEC60068-2-1/-2
Storage temperature	-40 °C to +70 °C
Approvals & classes	ABS, BV, CE, DNV, GL, LR, MED
Mechanical quantities	
Motor torque	static: 4 mNm; dynamic 1.2 mNm
Orientation	any
Fixation	fastening screws with dovetail key and hand knob (tool-less)
Connection	8 pole flat connector plug with screw lock
Housing material	fibre glass reinforced, UV stabilised plastic; upper part: PC GF10; base plate: PC GF30 faceplate made of non-reflective float glass
Dimensions and weights	square: 72 mm, 96 mm, 144 mm frame size. round: 60 mm, 80 mm, 100 mm, 130 mm tubular diameter. Installed depth (all models incl. connector plug): about 80 mm Weights round: 60mm = 145g, 80mm = 185g, 100mm = 245g, 130mm = 375g Weights square: 72mm = 170g, 96mm = 250g, 144mm = 510g
Other	
Illumination	externally dimmable LED illumination; PWM frequency = 70 Hz
Initialisation time	about 5 seconds after switch on of supply voltage
Minimum switch on period	2 min, to store altered basic brightness permanently. 3 min, to move the pointer from any position to the zero position.
Scale angle	any up to a maximum of 300° (standard 240°) with pointer (LSSM3) or 360° with pointer disk (LRSM3)
Operation	two rear-side pushbuttons for setting various parameters (see text above)

- specifications subject to change without notice -

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