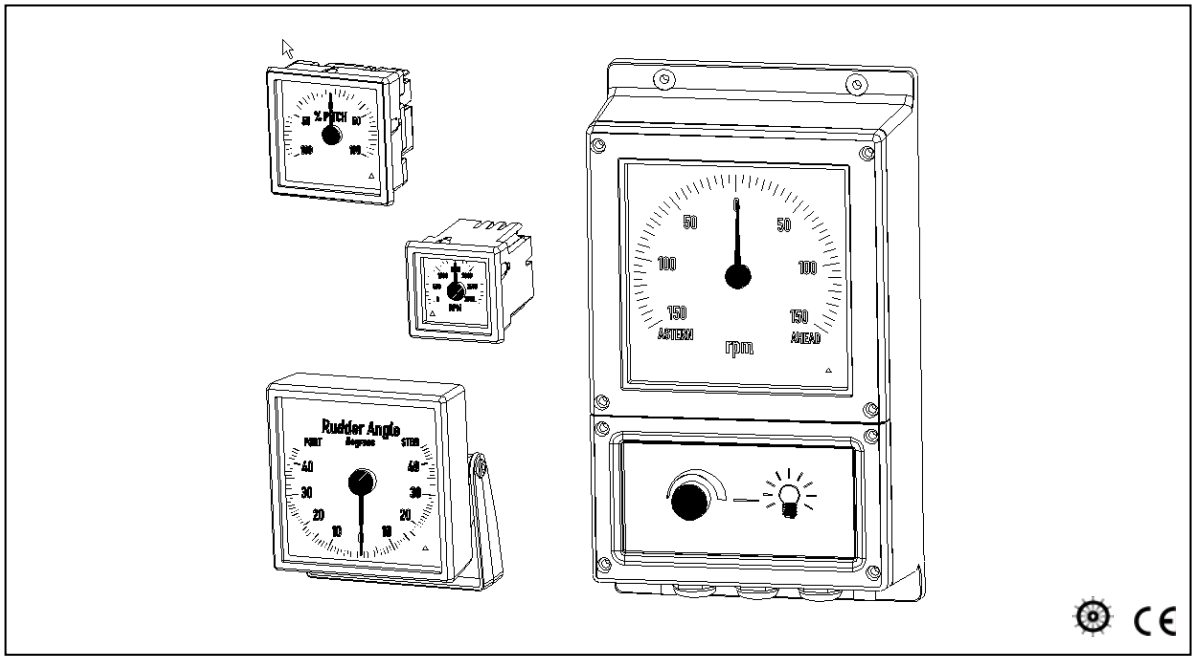
DEIF A/S

Data sheet

XL/BW/BRW-2 series

Illuminated indicators

4921250057K



Product design

Linearity

- Class 0.5

Scales

- Custom scale design

Robust design

- Shock: 100g 11ms
- Vibration: 2.1g

MED approval

- According to European Marine Directive 96/98/EC as amended

Housing

- Panel types (XL)
- Bridge wing types (BW and BRW-2)

Illumination

- Direct pointer illumination
- Transillumination of the scale with white LEDs

Pointers

- Standard pointer
- Rotating disc

Analogue interface

- Single analogue input with several ranges
- Dual analogue input for direct connection to SIN/COS transmitter

CAN interface

- Dual communication line for redundancy, according to marine standard
- Custom CAN solutions

Technology
The new DEIF indicators use a center placed, microprocessor-controlled x-coil system. This patent pending x-coil technology is the core of this new product series. The clear advantages of this indicator principle compared to the more fragile moving-coil system are e.g. superb accuracy (class 0.5), improved response time with practically no overshoot, excellent torque of the x-coil system, direct pointer illumination, connection to CANbus, improved shock resistance, more robust construction, 360° pointer movement etc.

For supplying the built-in microprocessor, the XL/BW/BRW-2 indicators need connection to an aux. supply.

Housing
XL type
The XL type is designed for panel mounting in standard cutout DIN holes. Since the frame sizes are not according to DIN norms, IP66 protection is possible without compromising the unique design of the indicator.

Special front mounted panel versions are available in sizes XL96 and XL144. These also come with the option of IP66 protection.

BW and BRW-2 types
Indicators for bridge wing mounting. These are basically XL indicators with an outside enclosure and with built-in dimmer. IP66 protection is standard.

Interface
Due to the microprocessor-controlled x-coil technology, the indicators have a wide range of interfaces:

Analogue interface
Both single and dual analogue signals are supported by the analogue interface. This enables the indicators to replace a number of existing products, e.g. all standard analogue ranges and special SIN/COS indicators.

Galvanic separation between analogue inputs, aux. supply and dimmer. Dual inputs share common ground.

Custom CAN interface
A single line CANbus for direct connection of indicators to a CAN transmitter. The interface is tested with several standard CAN transmitters, but special solutions are also possible.

Dual CAN interface
The CANopen interface offers functionality with 1 or 2 CAN lines and full redundancy from two galvanically separated CAN lines.

Galvanic separation between CAN 1, CAN 2 and supply.

The CANopen application is based on:

- CiA Draft Standard 301 - Application Layer and Communication Profile - Version 4.02
- CiA Draft Standard Proposal 302 - Framework for CANopen Managers and Programmable CANopen Devices - Version 3.3.0
- CiA Draft Standard Proposal 305 - Layer Setting Services and Protocol - Version 1.1.1

More detailed CAN information is available on www.deif.com (documentation), and EDS file is available from the software download section.

Illumination
Direct pointer illumination (black scales) is based on separate LEDs (yellow), and the scale is transilluminated using white LEDs. Black shadow pointer is used for white scale designs.

Pointers
Standard pointers are virtually lightguides shaped as needle type pointers. The full length illumination of the pointer makes the read-out extremely easy, even at longer distances. As an option, a rotating disc with illuminated symbol is available.

Pointer deflection
The pointer is able to move 360 degrees (endlessly). Standard pointer movement is clockwise. Counter-clockwise movement is optional.

Error functions
The indicators have two different error functions:

Internal error warning LED
The amber coloured warning LED is triangular and is placed in the lower right corner of the scale, except in XL72 where it is in the lower left corner.

If there is an internal error (microprocessor stops), the flashing warning LED will indicate to the operator that the product is out of order (only analogue types). Using the CAN interface, this function is handled by a missing heartbeat signal on the CANbus. On CAN types a missing or invalid CAN signal will also start the warning LED. During start-up the warning LED will flash for a few seconds, until the indicator is ready.

External error pointer indication
This is a new functionality on this type of product. Due to the possibility for 360 degrees pointer rotation, the unused scale part (typically the 240…0 degrees area) is used as an error indication field. Under certain conditions the pointer will move to this position:

- Out of range analogue input signal
- Missing CAN signal

More detailed information about error functionality is available on www.deif.com (User's Manual).

CAN setup
When using the CAN interface, the setup of the instrument can be changed from the master using LSS (Layer Setting Services). After changing to configuration state mode, it is then possible to change Baud rate and Node-ID.

Default setup is:

- Baud rate 125kbit/s
- Node-ID number 1

Customer configuration
The flexibility of the XL/BW/BRW-2 series requires the customer to make some selections for use when ordering the indicator. These selections determine how the indicator will appear at delivery. The table below will guide you through the configuration via the necessary selections.

Customer configuration

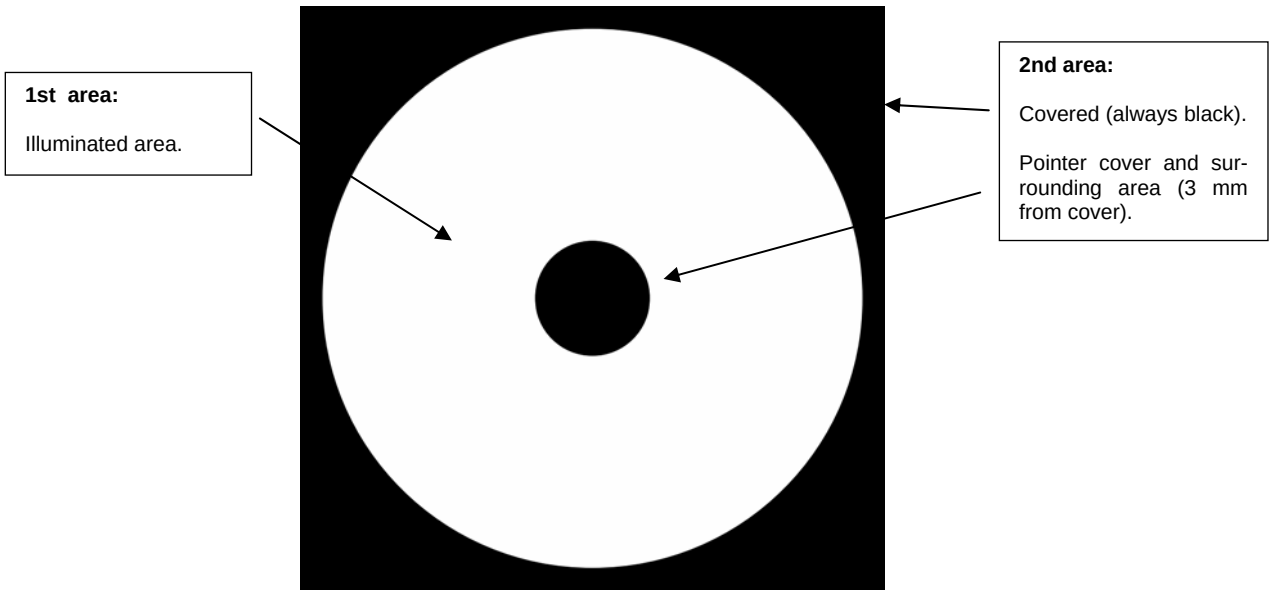
	Customer options			Note
Housing	XL standard (rear mounted)	Size:	□ 72	DIN cutout
			□ 96	
			□ 144	
			□ 192	
		Protection:	□ IP52 (standard)	
			□ IP66	
	XL - front mounted	Size:	□ 96	
			□ 144	
		Protection:	□ IP52 (standard)	
			□ IP66	
	Bridge wing mounted	Type:	□ BW144	IP66 (standard)
			□ BW192	IP66 (standard)
			□ BRW-2	IP66 (standard)
Input	Analogue	Type:	□ Single	Input 1 terminals used
			□ Dual SIN/COS potentiometer	(Not current input/loop)[1]
			□ Dual linear potentiometer	(Not current input/loop)[1]
		Range:	□ 0...1V	Load: 1kOhm
			□ 0...10V	Load: 10kOhm
			□ -1...0...1V	Load: 1kOhm
			□ -5...0...5V	Load: 10kOhm
			□ -10...0...10V	Load: 10kOhm
			□ 0...1mA	Load: 1kOhm
			□ 0...20mA	Load: 50Ohm
			□ 4...20mA/20…4mA	Load: 50Ohm, 20…4mA on input 2
			□ -0.5...0...0.5mA	Load: 1kOhm
			□ -1...0...1mA	Load: 1kOhm
			□ -10...0...10mA	Load: 50Ohm
			□ -20...0...20mA	Load: 50Ohm
			□ Others	Specify request (within limits, page 6)
	Digital	Type:	□ Dual CANopen	
			□ CAN custom	Specify CAN transmitter and system
Pointer	□ Standard		Colour defined by scale design	White with yellow illumination or black shadow without illumination
	□ Rotating disc (Only on XL72/96 and XL/BW144 and only black disc/scale base)		□ Standard (known)	Specify design number
			□ Custom (new)	Specify design (see next page)
	ONLY 360 degree scales! Pointer position at electrical mid. of input		□ Pointer at 12 o'clock	Electrical mid. examples: 4…20mA => 12mA 10-0-10V => 0V 0-10V => 5V
			□ Pointer at 3 o'clock	
			□ Pointer at 6 o'clock	
			□ Pointer at 9 o'clock	
			□ Others	
	Deflection	□ Standard	Positive input moves pointer clock-wise (CW)	Standard default on single 4…20mA inputs as both functions are available
		□ Reversed	Positive input moves pointer coun-terclockwise (CCW)	
Scale	Scale curve		□ 0…180 degrees	Accuracy ±1.8 degrees
			□ 0…240 degrees	
			□ 0…300 degrees	
			□ 0…360 degrees	
			□ Others	
	Base colour		□ Black	White pointer with yellow illumination
			□ White	Black shadow pointer recommended for BW and BRW-2 types
	Design		□ Standard (known)	Specify design number
			□ Custom (new)	Specify design. Please see section conc. scale design principles

1) Dual input cannot be used in combination with current loops. Due to the design of the input circuit, only one indicator can be used per output in this configuration. If multiple indicators are needed on the same output, please use the voltage versions.

Please notice that not all options can be selected for the same indicator, and that some options may exclude others.

Scale design principles

The scale is divided into 2 different areas:



Design restriction

To ensure the automatic vision based calibration in our production, some restrictions are necessary regarding scale lines, colours etc.

Please contact DEIF A/S, and we will send you samples of our scale designs for inspiration.

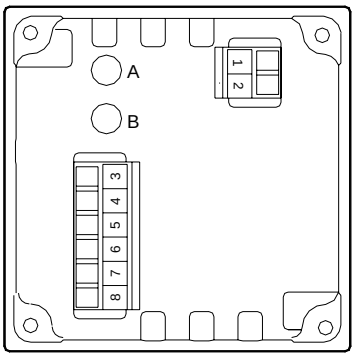
Standard colours used in the design of XL indicator scale

Scale colours are according to DEIF standard: Black, white, red, green, yellow. For further information, please contact DEIF A/S.

Terminals

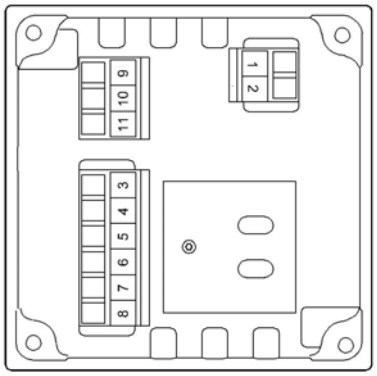
XL/BW/BRW-2 analogue input version

PIN no.	Function		Note
1	Supply voltage	0V	Consumption aux. supply connection: Max. 150mA
2		24V	
3	Analogue input	Input 1	Input 1 and GND used for single input. On 4…20mA, input 1 is CW and input 2 CCW
4		GND	
5		Input 2	
6	Illumination	Illumination +	Dimmer input. Dimmer range 7…30V DC Consumption max. 30mA
7		Illumination GND	
8	-	NC	Not connected - can be used freely
A	Analogue adjustment	Max. adjustment	Max. and min. adjustment, sealed by label. On 360 degree versions, A is EM selection and B digital offset
B		Min. adjustment	



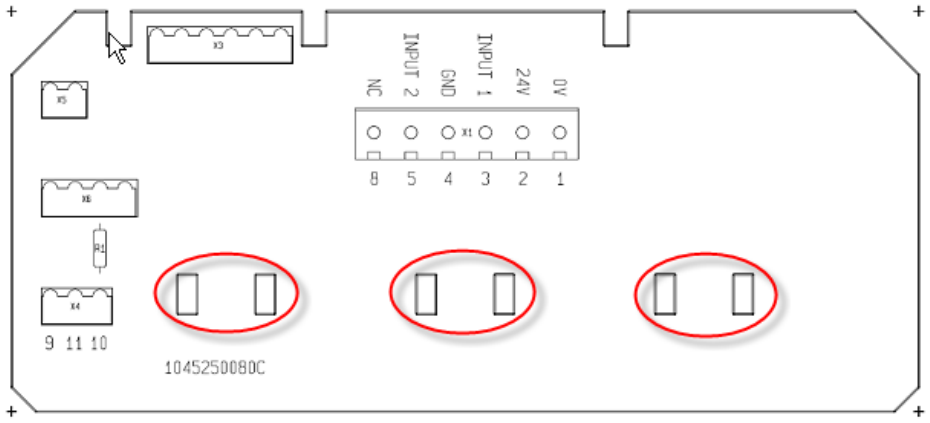
XL/BW/BRW-2 CANopen input version

PIN no.	Function		Note
1	Supply voltage	0V	Consumption aux. supply connection: Max. 150mA 18…31.2V DC
2		24V	
3	CAN connection	CAN 1 H input	CAN 1 line
4		CAN 1 L input	
5		CAN 1 GND [1)]	
6		CAN 2 H input	CAN 2 line
7		CAN 2 L input	
8		CAN 2 GND [1)]	
9	Illumination analogue dimmer	NC	Dimmer input. Dimmer range 7…30V DC Consumption max. 30mA
10		Illumination GND	
11		Illumination +	



BRW-2 analogue input PCB

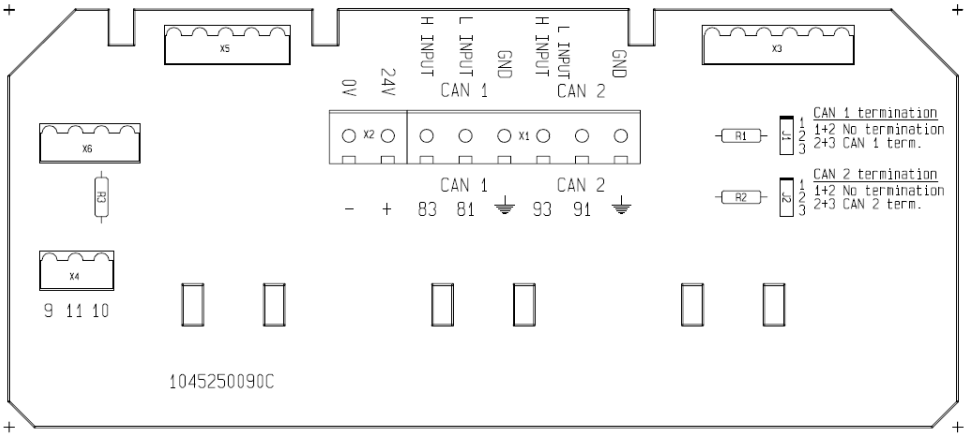
PIN no.	Function		Note
1	Supply voltage	0V	Consumption aux. supply connection: Max. 150mA
2		24V	
3	Analogue input	Input 1	Input 1 and GND used for single input. On 4…20mA, input 1 is CW and input 2 CCW
4		GND	
5		Input 2	



Connection interface board. Shields can be connected to avoid noise.

BRW-2 CANopen input PCB

PIN no.	Function		Note
	Supply voltage	0V	Consumption aux. supply connection: Max. 150mA 18…31.2V DC
		24V	
83	CAN connection	CAN 1 H input	CAN 1 line
84		CAN 1 L input	
		CAN 1 GND [1]	
93		CAN 2 H input	CAN 2 line
91		CAN 2 L input	
		CAN 2 GND [1]	



Jumpers J1 and J2 are used as end resistors of CAN 1 and CAN 2.

Technical specifications

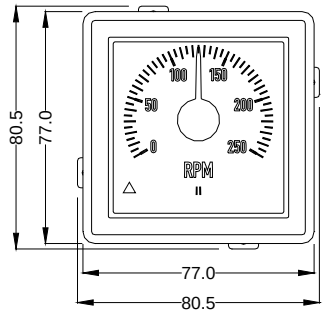
Indicators are designed according to the standards below					**Standards**
Accuracy	Class 0.5 (-10...15-30...55°C) measured at 360° deflection, corresponds to ±1.8° error				According to DEIF interpretation of EN 60051
Response time	90° per sec./no overshoot				
Instrument frame sizes	Size:	XL rear mount	XL front mount	BW	DIN 43700 for panel cutout only For BRW-2, see the dimensional drawing
	72	77 x 77 mm	-	-	
	96	102 x 102 mm	127.5 x 127.5 mm	-	
	144	148.5 x 148.5 mm	173 x 173 mm	148.5 x 148.5 mm	
	192	196 x 196 mm	-	196 x 196 mm	
Aux. supply	24V DC -25/+30% (18...24...31.2V DC) Reverse polarity protected				
Illumination supply	7-30V (max. 31.2V DC)				
Galvanic separation	600V AC between the following groups: CAN: Aux. supply; CAN 1; CAN 2 Analogue: Aux. supply; Analogue inputs (common); Dimmer				
Scale	According to customer design and specifications Base material: PMMA				
Pointer	Transparent polycarbonate with white print and yellow illumination (588nm), or Transparent polycarbonate with black print (shadow)				
Window	Antiglare 3 mm polycarbonate with UV blocking				UL94 V0
Disc	XL96	Ø 47 mm			
	XL144	Ø 70.5 mm			
	Always black scale base				
Housing	ASA/PC LURAN-S (plastic)				UL94 V0
Mounting angle	The indicators can be mounted at any angle between 0...150° horizontal without this affecting the calibration				DIN 16257
Compass safety distance	Steering compass: 0.50 m, stand-by/emergency compass: 0.10 m				IEC 945 and EN 60945
Measuring ranges	See standard ranges and load on page 3 Limits are ±1…±30V DC and ±1…±25mA DC Load special inputs: 1KΩ/V on voltage input and 1V on current input				
Analogue adjustments	Adjustments on rear side: A: Max. adjustment ±10% B: Min. adjustment ±5% On 360 degree versions: A: EM selector (CW = standard, CCW = 180 degree change) B: Digital offset of pointer, +/-10 degrees				
Out of range (analogue)	When the input is 2% out of range, the pointer is moved to error position				See the user's manual for details
Protection	XL standard: IP52 from front, mounted in panel, IP20 from rear (IP66 from front when recommended gasket is used) BW and BRW-2 standard: IP66				IEC 529 and EN 60529
Climate	Class H S E, short term condensing allowed				DIN 40040
	Max. 95% RH: Max. 30 days per year Max. 85% RH: Remaining days Max. 75% RH: Average per year				
Temperature	Nominal: -10…55°C Operating: -25…70°C Storage: -40…70°C				EN 60051
	Influence: Max. ±1.5% within -15...55°C				
Panel influence	The accuracy is affected neither by the material nor by the thickness of the panel				EN 60051
Panel thickness	Max. 18 mm (on XL versions, DIN rear mounted)				
Mechanical shock test	18 x 50g half sine (11ms)				IEC 600068-2-27
Drop impact resistance	18 x 100g (peak)				
Vibration test	3…13.2Hz: 2mm (peak-peak) 13.2…100Hz: 0.7g				EN 60945 DNV Class A
	3…13.2Hz: 6mm (peak-peak) 13.2…50Hz: 2.1g				DNV Class C

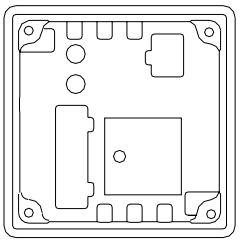
Technical specifications, continued

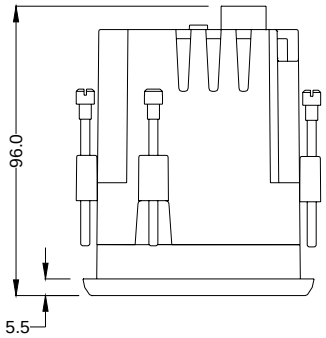
Indicators are designed according to the standards below		**Standards**
Safety	300V – CAT. III. Pollution deg. 2	EN 61010-1
Consumption (analogue)	Aux. supply: 65…75mA/24V DC Illum. supply: 15mA/24V DC (XL72/96), 20mA/24V DC (XL144/192)	
Consumption (CAN) including illumination	100...130mA/24V DC	
EMC	CE marked for industrial environment	EN 61000-6-V2/4 and EN 60945

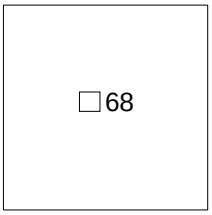
Dimensions in mm

XL72 RM (Rear Mounted)





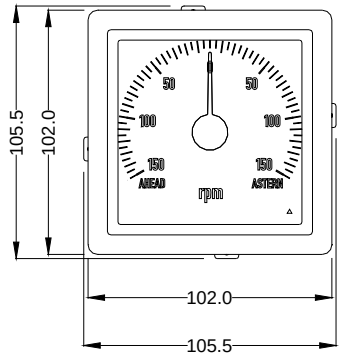


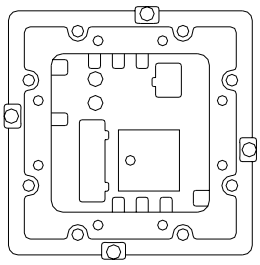


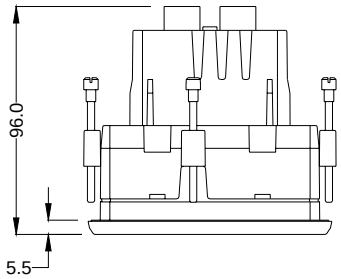
Panel cutout

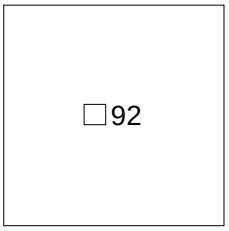
Weight: Approx. 245g

XL96 RM (Rear Mounted)





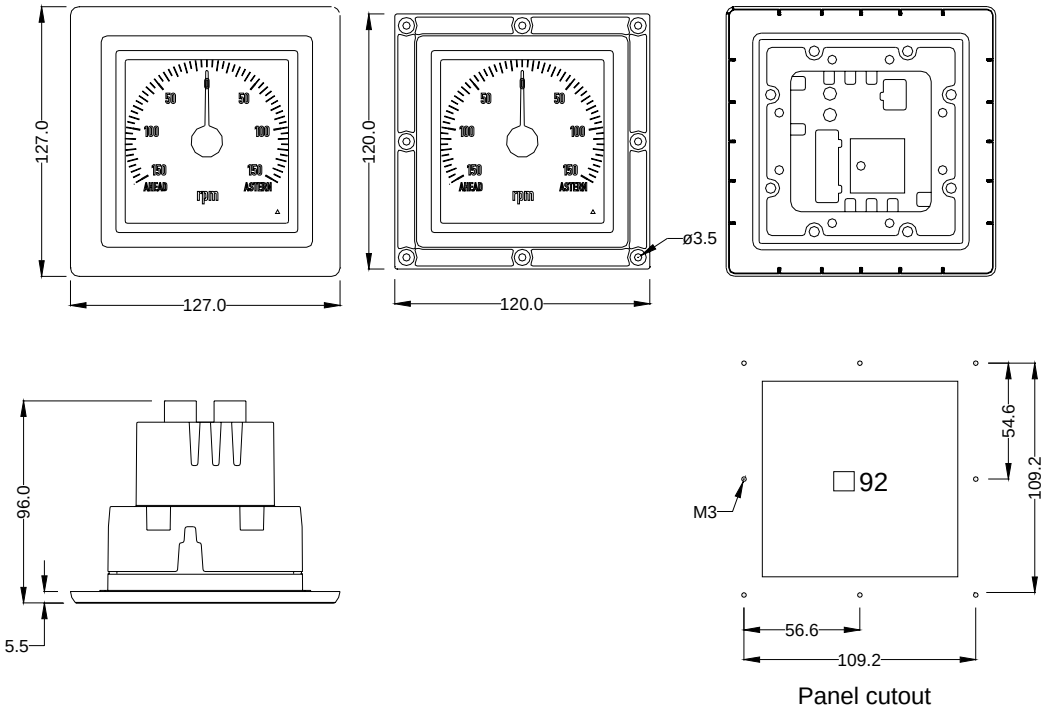




Panel cutout

Weight: Approx. 280g

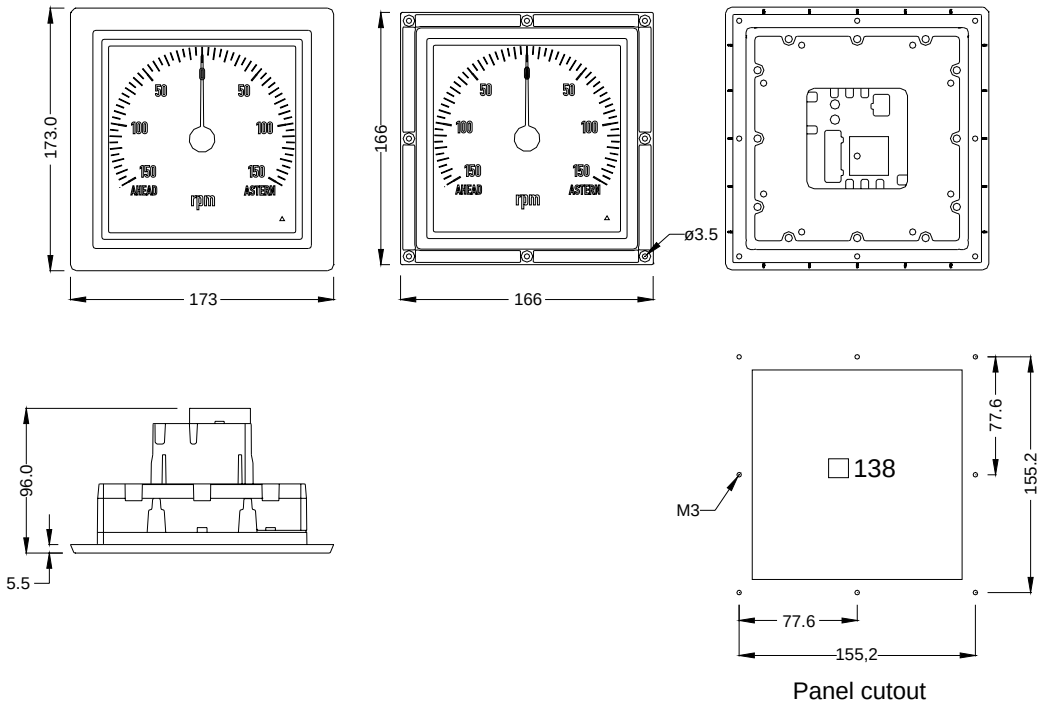
XL96 FM (Front Mounted)



Panel cutout

Weight: Approx. 280g

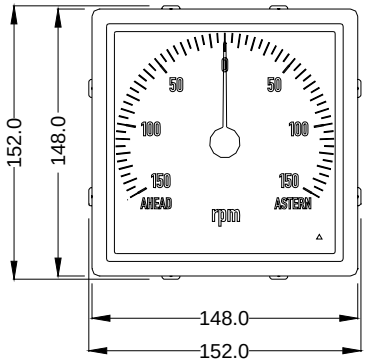
XL144 FM (Front Mounted)

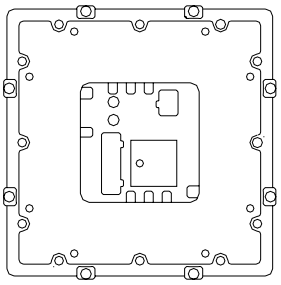


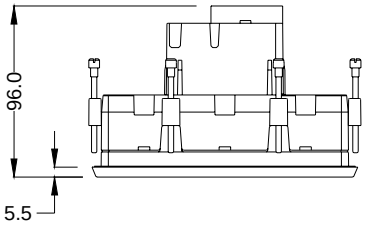
Panel cutout

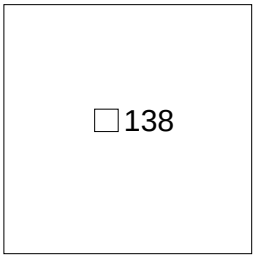
Weight: Approx. 350g

XL144





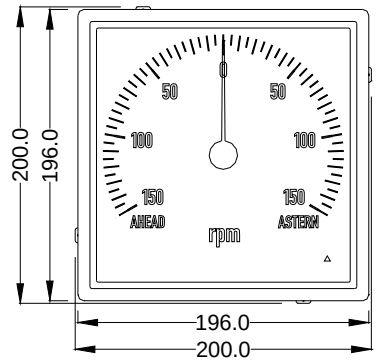


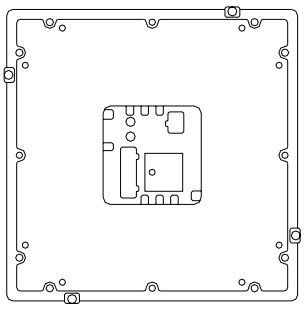


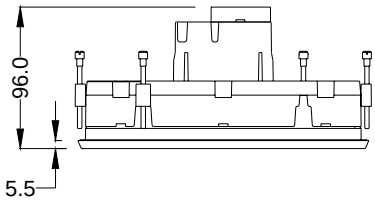
Panel cutout

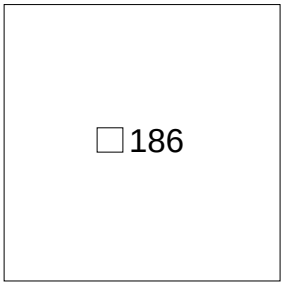
Weight: Approx. 350g

XL192





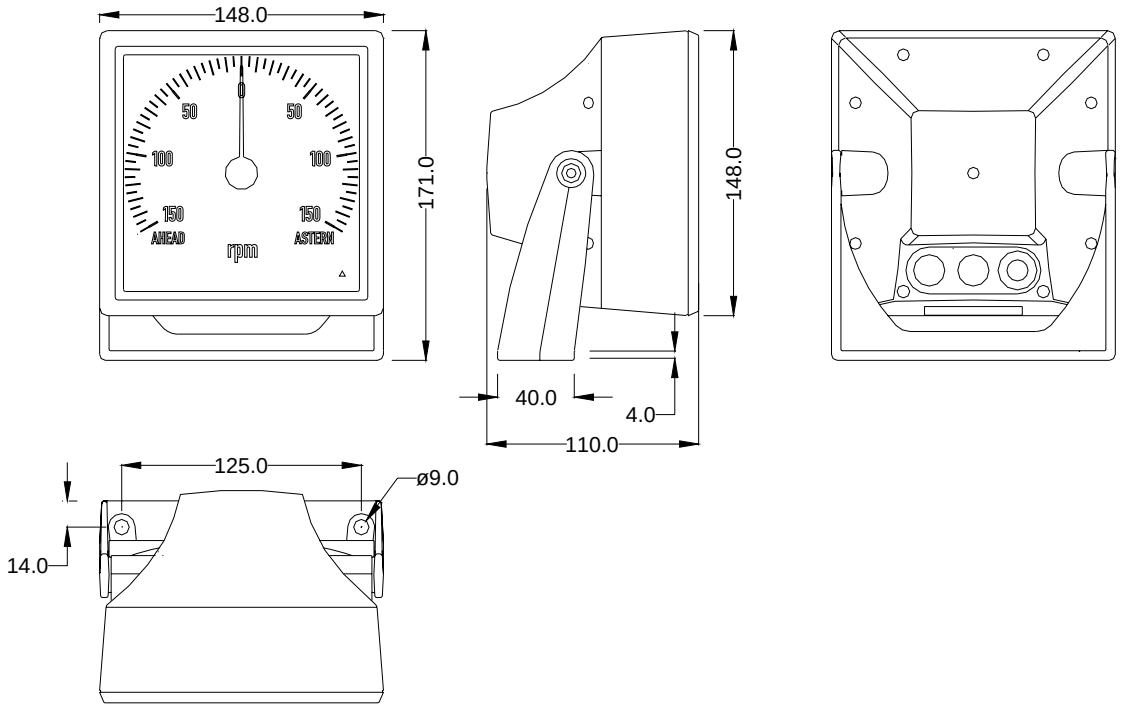




Panel cutout

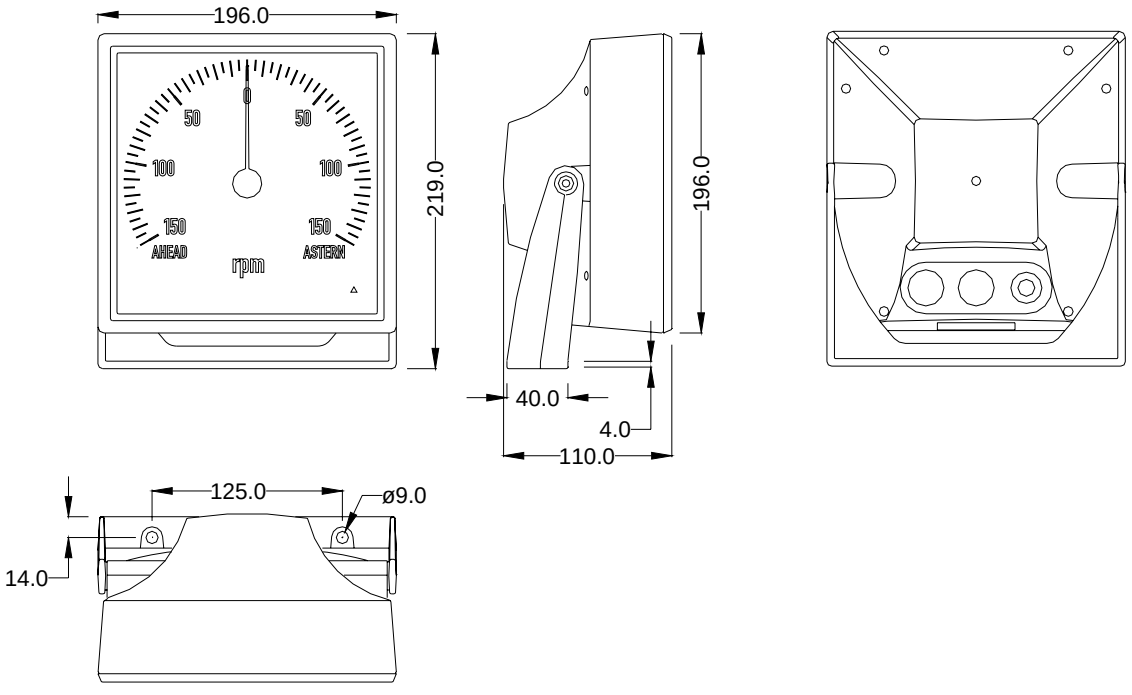
Weight: Approx. 475g

BW144



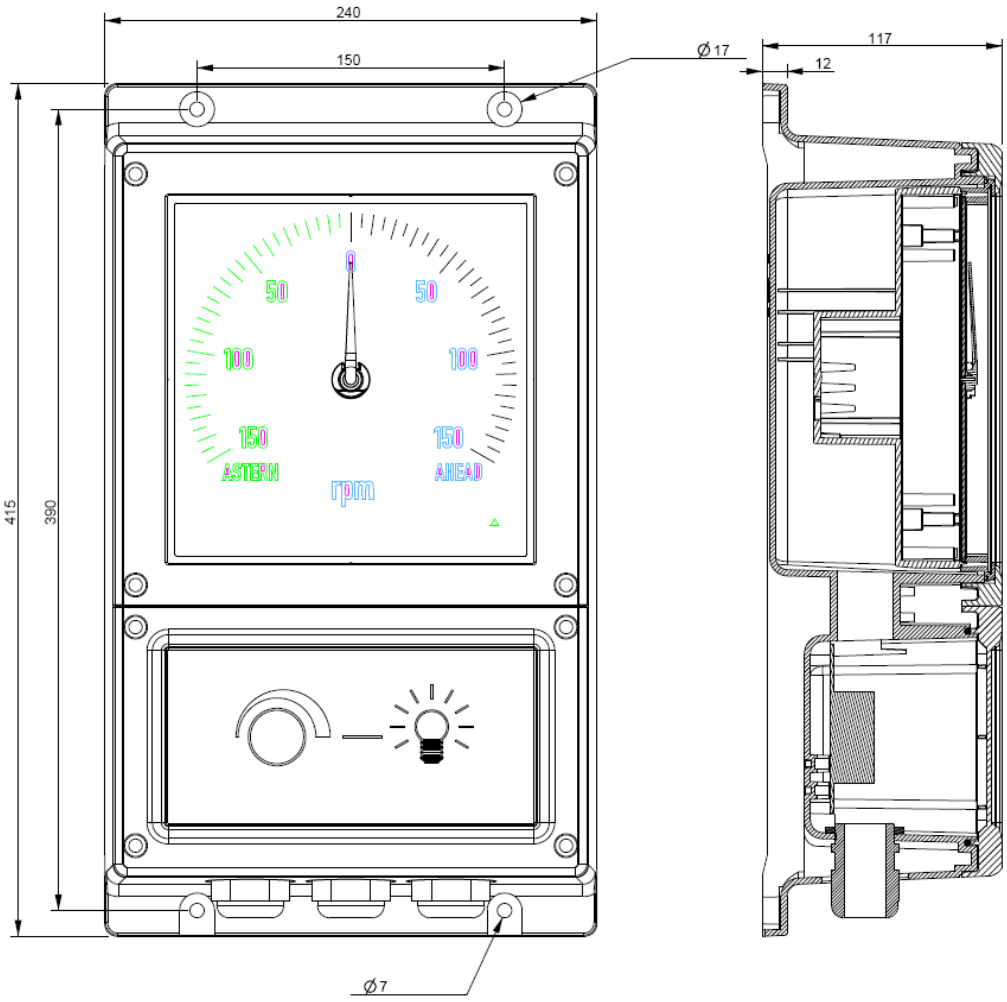
Weight: Approx. 540g

BW192



Weight: Approx. 800g

BRW-2



Weight: Approx. 2800g

Frame size and DIN panel cutout in mm (inches)

Indicator type	Frame size	DIN panel cutout
XL72	77.0 (3.031)	68.0 x 68.0 + 0.7 (2.667 x 2.667 + 0.028)
XL96	102.0 (4.016)	92.0 x 92.0 + 0.8 (3.622 x 3.622 + 0.031)
XL144	148.5 (5.846)	138.0 x 138.0 + 1.0 (5.433 x 5.433 + 0.039)
XL192	196.0 (7.716)	186.0 x 186.0 + 1.1 (7.323 x 7.323 + 0.043)
XL96 front mounted	127.5 (5.020)	92.0 x 92.0 + 0.8 (3.622 x 3.622 + 0.031)
XL144 front mounted	173.0 (6.811)	138.0 x 138.0 + 1.0 (5.433 x 5.433 + 0.039)
BW144	148.5 (5.846)	
BW192	196.0 (7.716)	
BRW-2	240.0 (9.448)	

Order specifications

Fill in the configuration form on page 3.

↓

Prepare drafts of preferred scale design, e.g. with reference to existing designs. At request DEIF provides scale designs for inspiration. The customer always approves the final scale design.

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