



Illuminated indicators, XL/BW/BRW-2 series DATA SHEET



Linearity

Class 0.5

Scales

- Standard scale design
- Custom scale design

Robust design

- Shock: 50 g 11 ms
- Vibration: 2.1 g

Approval

 Major class type approvals, see www.deif.com for certificates

Housing

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

Illumination

- Direct pointer illumination (yellow/orange)
- 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 or dual linear transmitter

CAN interface

- Dual CANopen communication line for redundancy, according to marine standard
- sCAN (DEIF single CAN)



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Technology

The patented x-coil technology is the core of this 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 degrees pointer movement etc.

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

Housing

Do not use indicators with black scale base for outside applications, as the warranty may be lost. Refer to the User's Manual for further information.

Panel types (XL)

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.

Bridge wing types (BW and BRW-2)

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.

sCAN interface

A single line CANbus for direct connection of indicators to a CAN transmitter.

Dual CANopen interface

CANopen interface with full redundancy from two galvanically separated CAN lines.

More detailed CAN information is available on www.deif.com (CAN specification), 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.

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. Counterclockwise movement is optional.

Pointer position is random until aux. supply is connected.

Error functions

The indicators have two different error functions:

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.

Pointer indication

Due to the possibility of 360 degrees pointer rotation, the unused scale part (typically the 240 to 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).

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.

XL/BW/BRW-2 series

Product configuration

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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.

Standard indicators (RPM, Pitch, etc.)

Input type:	Input 1:	Input 2:	Pointer position (scale):	STD design: EM=12 Pointer CW
4 to 20 mA	4 mA	-	-45	
0 to 10 V	0 V	-		
-10 to 0 to 10 V	-10 V	-		200 7 Pm
4 to 20 mA	12 mA	-	0	50 50
0 to 10 V	5 V	-		
-10 to 0 to 10 V	-10 V	-		200 200 // rpm
4 to 20 mA	20 mA	-	+45	
0 to 10 V	10 V	-		
-10 to 0 to 10 V	10 V	-		200 280 // rpm

Rudder indicators

When used in a system with TRI-2, XL must be CCW; or TRI-2 must be 20 to 4 mA and XL CW!

XL 4 to 20 mA can be changed from CW to CCW by the customer, and RT-2 can also be changed from CW to CCW during installation.

Input type:	Input 1:	Input 2:	Pointer position (scale):	FWD design: EM=6 Pointer CCW ¹	AFT design: EM=12 Pointer CCW ¹
4 to 20 mA	-	4 mA	-45	Rudder Angle	
0 to 10 V	0 V	-		40 40	20 20
-10 to 0 to 10 V	-10 V	-		20 20	40 Rudder Angle Degrees
4 to 20 mA	-	12 mA	0	Rudder Angle	
0 to 10 V	5 V	-			20 20
-10 to 0 to 10 V	-10 V	-		20 20	40 40 Rudder Angle Degrees
4 to 20 mA	-	20 mA	+45	Rudder Angle	0
0 to 10 V	10 V	-		40 40	20 20
-10 to 0 to 10 V	10 V	-			40 Rudder Angle

1: Make sure that the pointer rotation matches other indicators/transmitters in the system (TRI-2, RT-2, etc.).

XL azimuth standard indicators (EM = scale value zero)

Analogue Single, FWD and AFT designs:

Input type:	Input 1:	Input 2:	Pointer position (scale):	FWD design: EM=12 ² Pointer CW ¹	AFT design: EM=6 ² Pointer CW ¹
4 to 20 mA	4 mA	-	0	30 0 0 30 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	150 180 150
0 to 10 V	0 V	-		60 60 -90 -90	120 90-1120 90
-10 to 0 to 10 V	-10 V	-		120 150 180 150	60 ⁻ 30 ⁻ 30 ⁻ 30 ⁻
4 to 20 mA	8 mA	-	+90	30 0 30 1 1 1 1 2 30	150 180 150
0 to 10 V	2.5 V	-	90	60 90- 90- 90	120 90
-10 to 0 to 10 V	-5 V	-		120 150 180 150	
4 to 20 mA	12 mA	-	180	30 30 30 30	150 180 150
0 to 10 V	5 V	-		60 90- 90	120
-10 to 0 to 10 V	0 V	-		120 150 160 150	
4 to 20 mA	16 mA	-	-90	30 0 30 0 30 0 30	150 180 150
0 to 10 V	7.5 V	-	-	60 90	120 90- 90- 90
-10 to 0 to 10 V	5 V	-			

Make sure that the pointer rotation matches other indicators/transmitters in the system (RTA-602, etc.).
EM can be changed 180 degrees (from 6 ->12 or 12 -> 6) by turning the rear side adjustment potentiometer A.

Analogue SIN/COS interface, FWD and AFT designs:

Input type:	Input 1 (SIN):	Input 2 (COS):	Pointer position (scale):	FWD design: EM=12 ² Pointer CW ¹	AFT design: EM=6 ² Pointer CW ¹
4 to 20 mA	12 mA	4 mA	0	30 0 30 U	150 180 150
0 to 10 V	5 V	0 V	(A)	60 90	120 90-1-1-90
-10 to 0 to 10 V	0 V	-10 V		120 150 180 150	60 30 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4 to 20 mA	4 mA	12 mA	+90		150 180 150
0 to 10 V	0 V	5 V	(B)	60 90-90	120 90
-10 to 0 to 10 V	-10 V	0 V		120 150 180 150	60 30 0 30 CO
4 to 20 mA	12 mA	20 mA	180	30 30 30	150 180 150
0 to 10 V	5 V	10 V	(C)	60 90	120 90
-10 to 0 to 10 V	0 V	10 V		120 150 180 150	
4 to 20 mA	20 mA	12 mA	-90	30 0 30 30	150 180 150
0 to 10 V	10 V	5 V	(D)	60 90	120 90- 90- 90
-10 to 0 to 10 V	10 V	0 V		120 150 180 150	

Make sure that the pointer rotation matches other indicators/transmitters in the system.
EM can be changed 180 degrees (from 6 ->12 or 12 -> 6) by turning the rear side adjustment potentiometer A.



Steering Angle Feedback signals

XL/BW/BRW-2 series

Scale design

Standard designs:

Please see the "XL/BW/BRW-2 standard scale designs" document on www.deif.com for a complete list of standard designs.



Above: A selection of standard designs

Custom designs:

If the standard designs do not meet your requirements, it is possible to specify a design according to custom specifications.

However, some limitations are still present due to product performance, automatic testing and approvals. Please contact DEIF for further information and design more samples. Also, the MED restrictions are focusing more and more on the specific design, so please keep that in mind when making your own design!

Examples of custom design scale plates:



XL/BW/BRW-2 series

Terminals

XL/BW analogue input version				
PIN no.	Function		Note	
1	Supply voltage	0 V	Consumption max. 150 mA	
2	Supply voltage	24 V	Consumption max. 150 mA	
-				
3		Input 1	Input 1 and GND used for single input. On	
4	Analogue input	GND	4 to 20 mA, input 1 is CW and input 2	
5		Input 2	CCW	
6	Illumination	Illumination +	Dimmer input. Dimmer range 7 to 30 V _{dc}	
7	mummation	Illumination GND	Consumption max. 30 mA	
8	-	NC	Not connected - can be used freely	
А		Max. adjustment	Max. and zero adjustment, sealed by	
	Anglasus adjustes at		label.	
В	Analogue adjustment	Zero adjustment	On 360 degree versions, A is EM selection and B is zero adjustment.	



XL/BW CANopen input version

PIN no.	Function		Note	
1	Supply voltage	0 V	Consumption max. 150 mA	
2	Supply voltage	24 V	Consumption max. 150 mA	
		r		
3		CAN 1 H input		
4		CAN 1 L input	CAN 1 line (sCAN line)	
5	CAN connection	CAN 1 GND		
6	CAN connection	CAN 2 H input		
7		CAN 2 L input	CAN 2 line/or for external switch for	
8		CAN 2 GND	calibrating sCAN (see user's manual)	
9	Illumination analogue	NC	Dimmor input. Dimmor range 7 to 20 1/	
10	Illumination analogue dimmer	Illumination GND	Dimmer input. Dimmer range 7 to 30 V _{dc} Consumption max. 30 mA	
11	ummer	Illumination +	Consumption max. 50 mA	



Use strips to terminate cable shields to metal termination plate (shown in the dashed circle) to avoid noise.



XL/BW/BRW-2 series

Technical specifications

Indicators are design	ned accor	ding to the standards belo	w	Standards
Accuracy	deflection	5 (-10 to <u>15 to 30</u> to 55 °C) m n, corresponds to ±1.8 degre	According to DEIF interpretation of IEC/EN 60051	
Response time	the point	n pointer speed is 90 degree er is ramped up/down during		
Indicator frame sizes	Type: XL72 XL96	Front size: 77 × 77 mm 102 × 102 mm	Recommended panel cutout: 68.5 × 68.5 mm 92.5 × 92.5 mm	XL will typically fit DIN 43700 cutout, but DEIF recommends a bit larger
and panel cutout	XL144 XL192	148.5 × 148.5 mm 196 × 196 mm and BRW-2, see the dimensi	138.5 × 138.5 mm 186.5 × 186.5 mm	cutout to better match IP66 gasket option!
Power supply	24 V _{dc} -2 Reverse	5/+30% (18 to 24 to 31.2 V _{dc} polarity protected minimum voltage: 9.6 V _{dc}		
Illumination supply Connectors	Analogu		crew terminals: 0.2 to 2.5 mm ² dual spring terminals: 0.2 to 2.5	
Connectors	mm ²	petween the following groups		
Galvanic separation	CAN: Analogue	Aux. supply; CAN 1; CAN e: Aux. supply; Analogue in	12	
Scale		terial: PMMA		
Pointer	illuminati	ale: Transparent polycarbona on (588nm), or ale: Transparent polycarbona	ate with white print and yellow ate with black print (shadow)	
Window		lycarbonate with UV blocking		UL94 V0
	XL72		Ø 31 mm	
Disc	XL96		Ø 47 mm	
DISC	XL144		Ø 70.5 mm	
		lack scale base		
Housing	XL/BW: ASA/PC LURAN-S (plastic) BRW-2: LURAN-S, colour code: RAL 7001			UL94 V0
Mounting angle	nonzontal without this affecting the calibration		DIN 16257	
Compass safety distance			emergency compass: 0.40 m	IEC/EN 60945
Measuring ranges	Limits ar Load spe		5 mA _{dc} e input and 1 V on current input	
sCAN calibration	needs ar	nd pointer deflection changed		See the User's Manual for details
Analogue	Adjustments on rear side: A: Max. adjustment ±20 % B: Zero adjustment ±10 %			
adjustments	On 360 degree versions: A: EM selector (CW = standard, CCW = 180 degree change) When the input is 2 % (-2 to 102 % of F.S.) out of range, the pointer is			See the User's Manual
Out of range (analogue)		e input is 2 % (-2 to 102 % of o error position	F.S.) out of range, the pointer is	for details
Protection			d in nanel IP20 from rear	
(International protection rating)	XL standard: IP52 from front, mounted in panel, IP20 from rear (IP66 from front when recommended gasket + clamps are used) BW and BRW-2 standard: IP66			IEC/EN 60529
Climate	Class H S E, short term condensing allowed Max. 95 % RH: Max. 30 days per year Max. 85 % RH: Remaining days Max. 75 % RH: Average per year			DIN 40040
Tomporatura	Operatin Storage:	g: -25 to 70 °C		IEC/EN 60068-2-1 Cold IEC/EN 60068-2-1 Dry
Temperature		e: Max. ±1.5 % within -15 to 5	heat IEC/EN 60051	
Panel influence	The accuracy is affected neither by the material por by the thickness of			IEC/EN 60051
Panel thickness		mm (on XL versions, DIN rea	ar mounted)	

1. 1		
Indicators are design	ned according to the standards below	Standards
Mechanical shock test	18 × 50 g half sine (11 ms)	IEC 60068-2-27
Vibration test	3 to 13.2 Hz: 2 mm (peak-peak) 13.2 to 100 Hz: 0.7 g	EN 60945 DNV Class A
VIDIATION LEST	3 to 13.2 Hz: 6 mm (peak-peak) 13.2 to 50 Hz: 2.1 g	DNV Class C
Safety	300 V – CAT. III. Pollution deg. 2	EN 61010-1
Consumption (analogue)	Aux. supply: 65 to 75 mA/24 V _{dc} Illum. supply: 15 mA/24 V _{dc} (XL72/96), 20 mA/24 V _{dc} (XL144/192)	
Consumption (CAN) including illumination	100130 mA/24 V _{dc}	
EMC	CE-marked for industrial environment	EN 61000-6-V2/4 and EN 60945

Technical specifications, continued

Dimensions in mm











Order specifications

Manual product configuration:



Example of order specification for an XL96 rudder angle indicator with a black base scale (-45 to 0 to 45 degrees rudder angle):



1. Housing:	Panel type XL96, protection IP52 (standard)
2. Input:	Analogue, single, -10 to 0 to 10 V
3. Pointer:	Standard
4. Scale:	Standard, no.: 4150250357



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Due to our continuous development we reserve the right to supply equipment which may vary from the described.

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