



Serial Analogous Indicators

SERANA-Q 96
SERANA-Q 144



Application

Many navigation devices must provide analogous outputs in order to drive analogous indicators. However, serial outputs are mostly available, standardized, and cheaper in hardware and cable routing.

The serial analogous indicators **SERANA-Q 96/144** from WEIGEL convert serial NMEA signals into analogous signals and display them.

SERANA-Q can be realized customer - specific:

- Special receiving protocols
- Conversion of units (e.g. meters in feet)
- Customized scaling factor
- Customer - specific design and pointer colour
- Customer logo (only for size 144)

Features

- Indication of operating states via multicolour LED (e.g. timeout, out of range, loss of redundancy)
- Detection and signalling of cable breaks or data errors
- External dimming via potentiometer, optionally also incremental encoder or DIM keys
- Central dimming via NMEA DDC protocol
- Second interface for supporting first error failure safety
- Trend indication via direction LEDs optional possible
- Logarithmic indicators (e.g. for depth) optional possible
- Filtering of disturbing signals and conversion of displayed units

Operating Principle

A microprocessor converts the digital input signals and provides an analogous output signal fed into a moving coil movement.

Moving -coil movement with swivel coil, pivot suspended.

Spring loaded jewel bearings for vibration and shock resistance.

Mechanical Data

case details	square housing suitable to be mounted in control panels, machine tool consoles, or mosaic panels, stackable	
material of case	plastics	
front window	anti -glare glass	
colour of bezel	black (similar to RAL 9005)	
position of use	vertical $\pm 30^\circ$ ↕	
panel fixing	4 screw clamps	
panel thickness	2 ... 40 mm	
terminals	pluggable screw terminal barrier strip with screw fixing, RJ45 for Ethernet optional ↕	
dimensions (in mm)	SERANA-Q 96	SERANA-Q 144
bezel	□ 96	□ 144
case	□ 90	□ 136
panel cutout	□92 ^{+0.8}	□138 ⁺¹
weight approx.	0.4 kg	0.9 kg

↕ also refer to "Options"

General Technical Data

enclosure code	"Exposed" the device additionally fulfills IP 66 case front, IP 20 terminals
safe distance to the	
standard magnetic compass	0.75 m
steering magnetic compass	0.45 m
reduced safe distance to the	
standard magnetic compass	0,45 m
steering magnetic compass	0.30 m

Auxiliary Supply

auxiliary voltage	24 V DC (9 ... 36 V DC)
power consumption	≤ 3 VA

Interfaces/Inputs

2x data receiver according to IEC 61161-1 and IEC 61161-2
 1x input for brightness adjustment for potentiometer 10 kΩ (any potentiometer in the range 1-10 kΩ possible)
 1x RS485 interface (for service/dimming/calibration)
 1x CAN V2.0 A and B up to 1 Mbit/s for proprietary CAN messages
 optional 1x Ethernet ↕

Display

indicated unit	
with MED certificate	rotation speed, rudder angle, propeller speed
with Type Approval	all data according to IEC 61162 possible, e.g. speed (through water/over ground, transversal/longitudinal), propulsion, side propulsion, side propeller pitch, propeller pitch, side rotation direction, or inclination ↕
dial	flat dial
dial colour	black ↕
scale characteristics	linear, linear with overflow, or logarithmic without/with overflow
scale division	coarse - fine
dial illumination	dimnable LED illumination, via protocol or via external potentiometer
pointer	bar / knife - edge pointer
pointer deflection	0 ... 240°
pointer colour	white ↕
status indication	1 multicolour LED RGB optional 2 green LEDs for trend indication ↕

LED	color	function	description
●	green	status	device works flawlessly, valid data is available in the denotable indication range from secondary and/or primary receiver
●	yellow	status	no data or overflow of range
▶	green	trend	moving direction of the pointer
◀	green	trend	



Serial Analogous Indicators

Accuracy at Reference Conditions

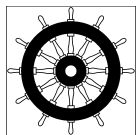
accuracy class	1
reference conditions	
ambient temperature	23 °C
position of use	nominal position ±30°

Environmental

climatic suitability	according to IEC 60945 device class "Exposed"
operating temperature range	-25 ... +55 °C
storage temperature range	-25 ... +70 °C
relative humidity	≤ 95%, non-condensing
vibration resistance	15 g, 11 ms
shock resistance	+/-1 mm, 2 ... 13.2 Hz 7.2 m/s ² , 13.2 100 Hz

Standards and Certificates

marine application with certificate according to directive 2014/90/EU



with MED certificate
MED/4.9 Rotation speed
MED/4.20 Rudder angle
MED/4.21 Propeller speed



with Type Approval DNV-GL
speed, propulsion, side propulsion,
propeller pitch, side propeller pitch,
rate of turn, inclination,
and other

DIN EN 60 529 Enclosure codes by housings (IP-code)

Ships and marine technology –

ISO 20672	Rate of turn indicators
ISO 20673	Electric rudder angle indicators
ISO 22554	Propeller shaft revolution indicators – Electric type and electronic type

Maritime navigation and radiocommunication equipment and systems –

IEC 60945	General requirements – Methods of testing and required test results
IEC 61162-1	Digital interfaces – Part 1: Single talker and multiple listeners (4800 Baud)
IEC 61162-2	Digital interfaces – Part 2: Multiple talkers and multiple listeners, Highspeed transmission (38400, 115200 Baud)
IEC 62288	Presentation of navigation-related information on shipborne navigational displays – General requirements, methods of testing and required test results

Options

interfaces/inputs

1x Ethernet (10/100 Mbit) for proprietary NMEA UDP protocols
(This interface must not be connected to a network according to the IEC 61162-450 standard. The interface has not been tested for this application.)

indicated unit e.g. speed, roll, pitch, and any in the NMEA standard included unit

case

position of use on request 30 ... 150°

trend indication 2 LEDs green

case

(see accessories) SERANA-Q 96/144 fitted into swivel frame case with/without potentiometer

Accessories

swivel frame case for SERANA-Q 96

swivel frame case for SERANA-Q 144

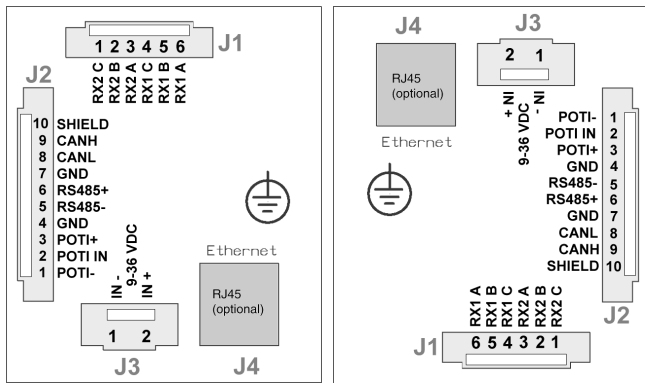
dimmer for mounting into control panel,
enclosure code „Exposed“, front IP66 additionally

dimmer in mounting case

with fixed set night illumination red, yellow, or white,
enclosure code „Exposed“, front IP66 additionally

DIM panel (96x96 mm) for central dimming of several devices via DDC protocol and additional functions such as setting the damping time and call-up of test functions

Terminals



No. Terminal J1: NMEA interfaces

1	RX2C	NMEA interface 2
2	RX2B	NMEA interface 2
3	RX2A	NMEA interface 2
4	RX1C	NMEA interface 1
5	RX1B	NMEA interface 1
6	RX1A	NMEA interface 1

No. Terminal J2: Interfaces

1	POTI-	- potentiometer for brightness adjustment
2	POTI IN	wiper potentiometer for brightness adjustment
3	POTI+	+ potentiometer for brightness adjustment
4	GND	RS485 ground
5	RS485-	-RS485 interface (for service/calibration)
6	RS485+	+RS485 interface (for service/calibration)
7	GND	CAN ground
8	CAN L	CAN low
9	CAN H	CAN high
10	SHIELD	shield

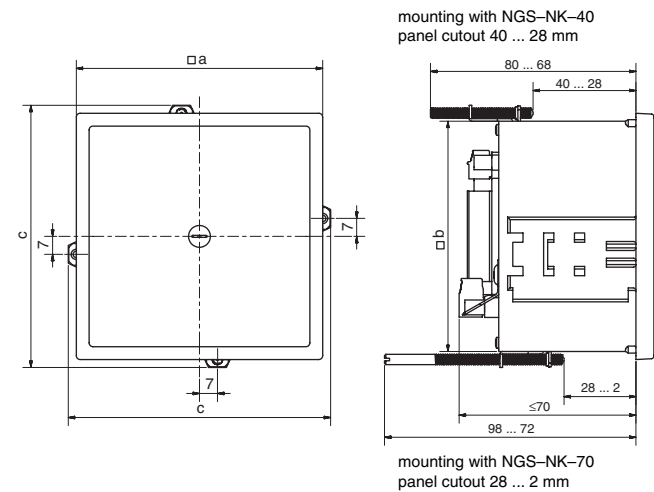
No. Terminal J3: Auxiliary supply

1	DC IN-	-24 V DC (9 ... 36 V DC)
2	DC IN+	+24 V DC (9 ... 36 V DC)

RJ45 jack J4: Ethernet optional

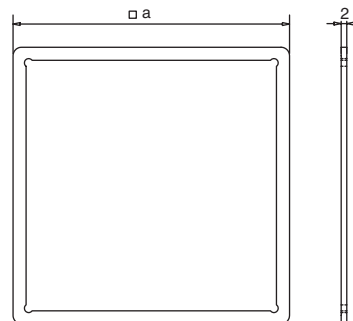
Dimensions

SERANA-Q



dimension (in mm)	SERANA-Q 96	SERANA-Q 144
a	96	144
b	90	136

seal



dimension (in mm)	SERANA-Q 96	SERANA-Q 144
a	97.5	145.5



Serial Analogous Indicators

Article Number Code

SERANA-Q MED/4.20 rudder angle indicator (MED certificate)

210 . 1 x x . 1 x x x x x x x x x

Factor for full-scale value
1 = 10
2 = 100

full-scale value			
0 = 1 ²⁾	5 = 2.5 ²⁾	A = 5.5 ¹⁾	F = 8 ¹⁾
1 = 1,2 ²⁾	6 = 3 ²⁾	B = 6 ¹⁾	G = 9 ¹⁾
2 = 1.25 ²⁾	7 = 4 ¹⁾	C = 7 ¹⁾	
3 = 1.5 ²⁾	8 = 4.5 ¹⁾	D = 7.5 ¹⁾	¹⁾ x10 only
4 = 2 ²⁾	9 = 5 ¹⁾	E = 7.6 ¹⁾	²⁾ x100 only

0 = white pointer
1 = yellow pointer

scale design no. X X X X X

scale design no. X X X X X

scale design no. X X X X X

scale design no. X X X X X

scale design no. X X X X X

1 = MED/4.20 rudder angle

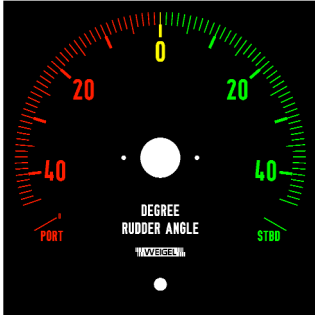
0 = data receiver according to IEC 61161-1 and IEC 61161-2
1 = data receiver according to IEC 61161-1 and IEC 61161-2 and Ethernet interface

3 = 96 x 96 mm ²
4 = 144 x 144 mm ²

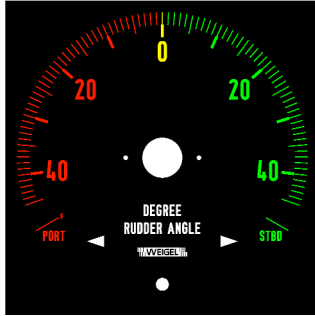
1 = square housing

scale design MED/4.20 rudder angle indicator

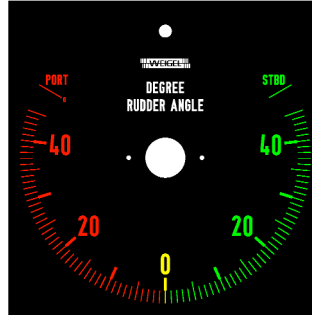
exemplary depiction of size SERANA-Q 144
 scale division 40° to 69°
 size SERANA-Q 96 without logo



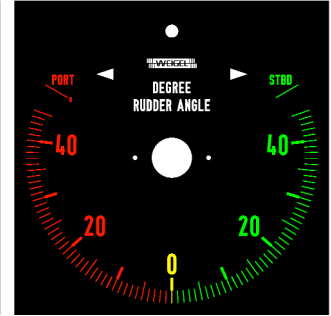
Q96 scale design no.: 09105
 Q144 scale design no.: 10105
 without trend LEDs



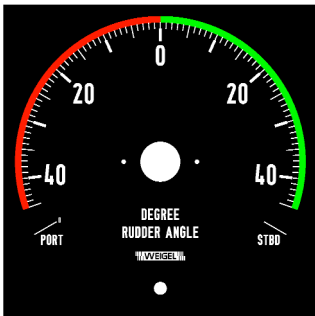
Q96 scale design no.: 09106
 Q144 scale design no.: 10106
 with trend LEDs



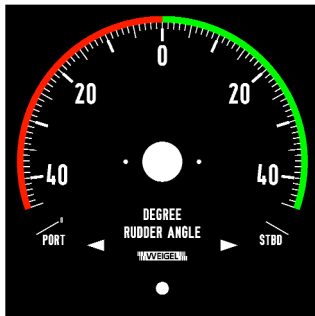
Q96 scale design no.: 09305
 Q144 scale design no.: 10305
 without trend LEDs



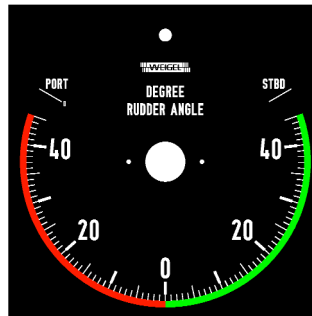
Q96 scale design no.: 09306
 Q144 scale design no.: 10306
 with trend LEDs



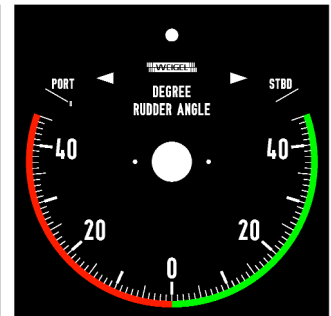
Q96 scale design no.: 09107
 Q144 scale design no.: 10107
 without trend LEDs



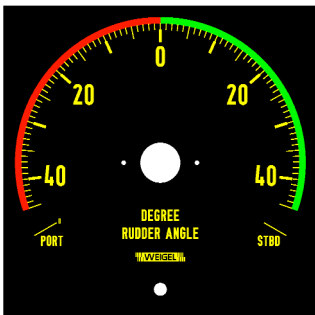
Q96 scale design no.: 09108
 Q144 scale design no.: 10108
 with trend LEDs



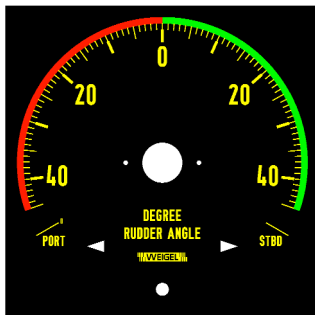
Q96 scale design no.: 09307
 Q144 scale design no.: 10307
 without trend LEDs



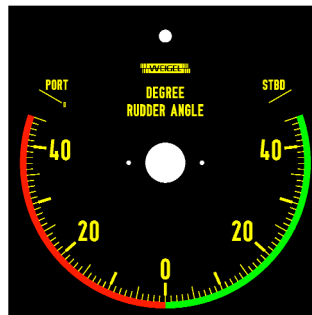
Q96 scale design no.: 09308
 Q144 scale design no.: 10308
 with trend LEDs



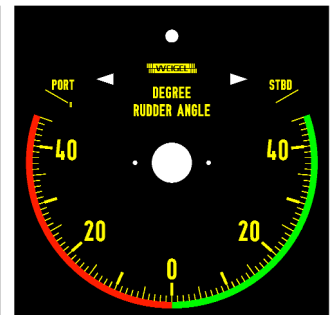
Q96 scale design no.: 09109
 Q144 scale design no.: 10109
 without trend LEDs



Q96 scale design no.: 09110
 Q144 scale design no.: 10110
 with trend LEDs



Q96 scale design no.: 09309
 Q144 scale design no.: 10309
 without trend LEDs



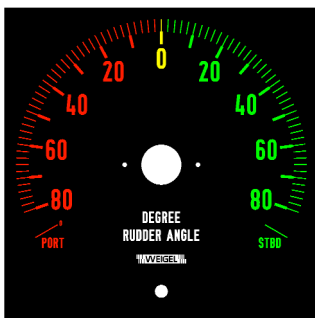
Q96 scale design no.: 09310
 Q144 scale design no.: 10310
 with trend LEDs



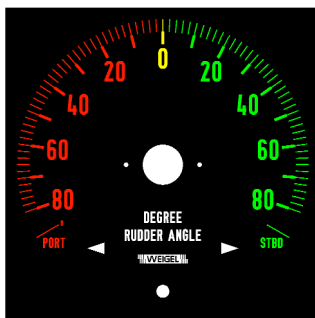
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scale design MED/4.20 rudder angle indication

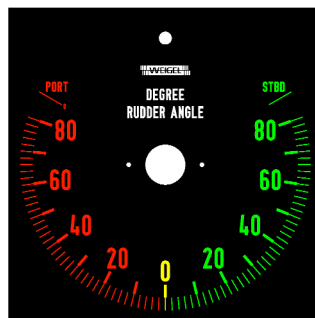
exemplary depiction of size SERANA-Q 144
scale division 70° or bigger
size SERANA-Q 96 without logo



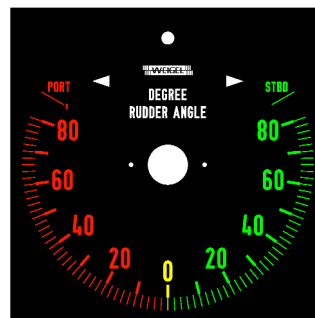
Q96 scale design no.: 09205
Q144 scale design no.: 10205
without trend LEDs



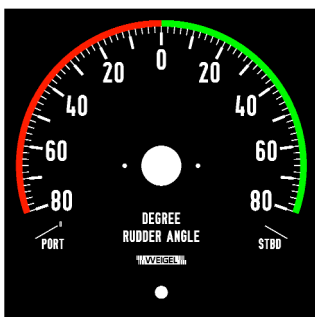
Q96 scale design no.: 09206
Q144 scale design no.: 10206
with trend LEDs



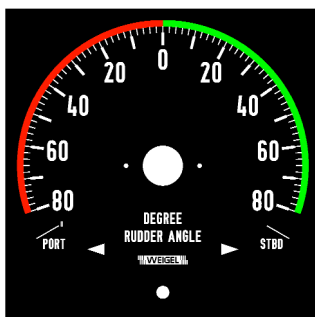
Q96 scale design no.: 09405
Q144 scale design no.: 10405
without trend LEDs



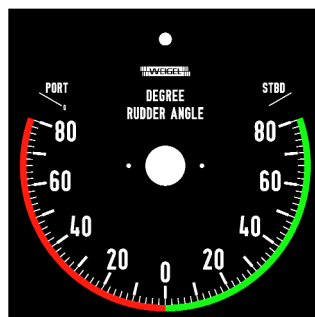
Q96 scale design no.: 09406
Q144 scale design no.: 10406
with trend LEDs



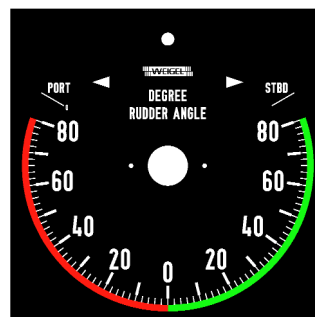
Q96 scale design no.: 09207
Q144 scale design no.: 10207
without trend LEDs



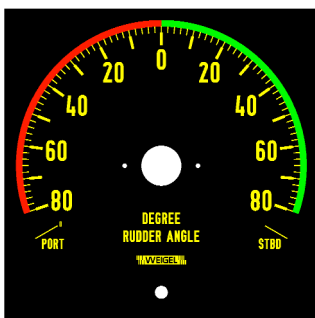
Q96 scale design no.: 09208
Q144 scale design no.: 10208
with trend LEDs



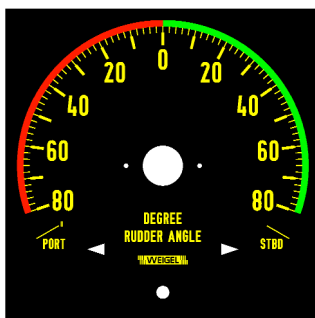
Q96 scale design no.: 09407
Q144 scale design no.: 10407
without trend LEDs



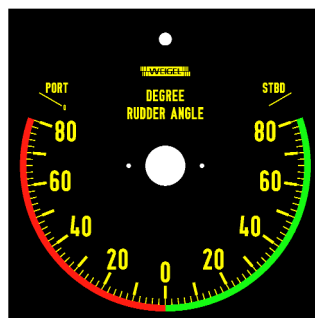
Q96 scale design no.: 09408
Q144 scale design no.: 10408
with trend LEDs



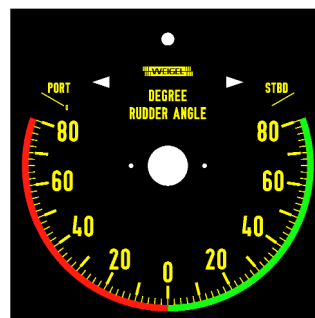
Q96 scale design no.: 09209
Q144 scale design no.: 10209
without trend LEDs



Q96 scale design no.: 09210
Q144 scale design no.: 10210
with trend LEDs



Q96 scale design no.: 09409
Q144 scale design no.: 10409
without trend LEDs



Q96 scale design no.: 09410
Q144 scale design no.: 10410
with trend LEDs

SERANA-Q MED/4.21 propeller speed (MED certificate)

210 . 1 x x . 2 x x x x x x x x

factor for full-scale value
 2 = 100 4 = 1k
 3 = 1000

full-scale value

0 = 1 ¹⁾	5 = 2.5 ¹⁾	A = 5.5	F = 8
2 = 1.25 ¹⁾	6 = 3 ¹⁾	B = 6	G = 9
3 = 1.5 ¹⁾	7 = 4 ¹⁾	C = 7	
4 = 2 ¹⁾	8 = 4.5 ¹⁾	D = 7.5	
	9 = 5	E = 7.6	

¹⁾ listed with factor 100 according to ISO 22554 standard

0 = white pointer
 1 = yellow pointer

scale design no. X X X X X

scale design no. X X X X X

scale design no. X X X X X

scale design no. X X X X X

scale design no. X X X X X

2 = MED/4.21 propeller speed

0 = data receiver according to IEC 61161-1 and IEC 61161-2
 1 = data receiver according to IEC 61161-1 and IEC 61161-2 and Ethernet interface

3 = 96 x 96 mm²
 4 = 144 x 144 mm²

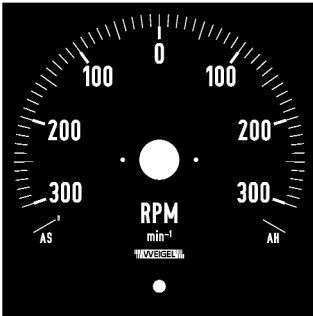
1 = square housing



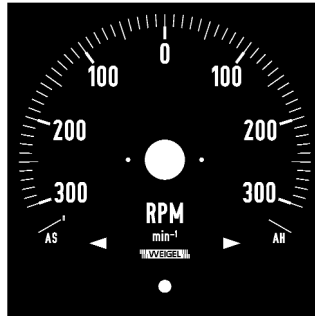
Serial Analogous Indicators

scale design MED/4.21 propeller speed

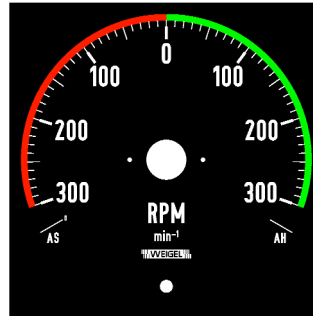
exemplary depiction of size SERANA-Q 144
size SERANA-Q 96 without logo



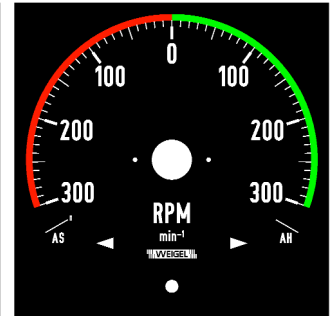
Q96 scale design no.: 09501
Q144 scale design no.: 10501
without trend LEDs



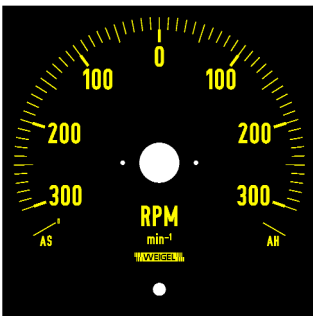
Q96 scale design no.: 09502
Q144 scale design no.: 10502
with trend LEDs



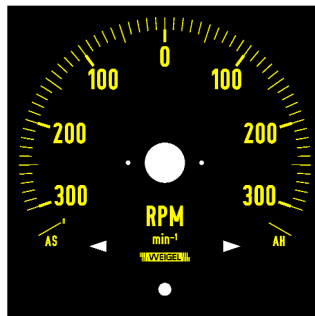
Q96 scale design no.: 09507
Q144 scale design no.: 10507
without trend LEDs



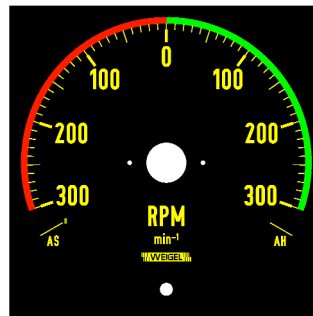
Q96 scale design no.: 09508
Q144 scale design no.: 10508
with trend LEDs



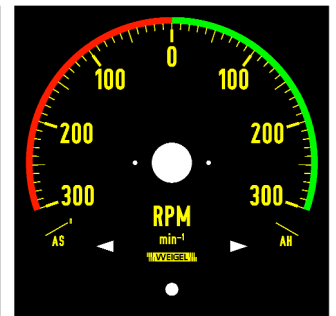
Q96 scale design no.: 09503
Q144 scale design no.: 10503
without trend LEDs



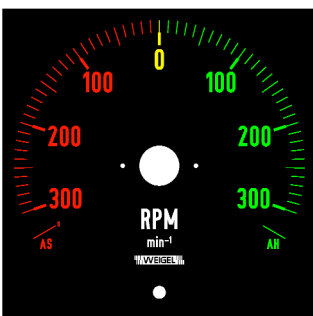
Q96 scale design no.: 09504
Q144 scale design no.: 10504
with trend LEDs



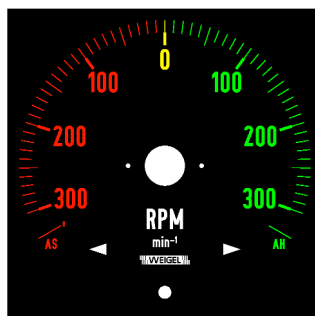
Q96 scale design no.: 09509
Q144 scale design no.: 10509
without trend LEDs



Q96 scale design no.: 09510
Q144 scale design no.: 10510
with trend LEDs



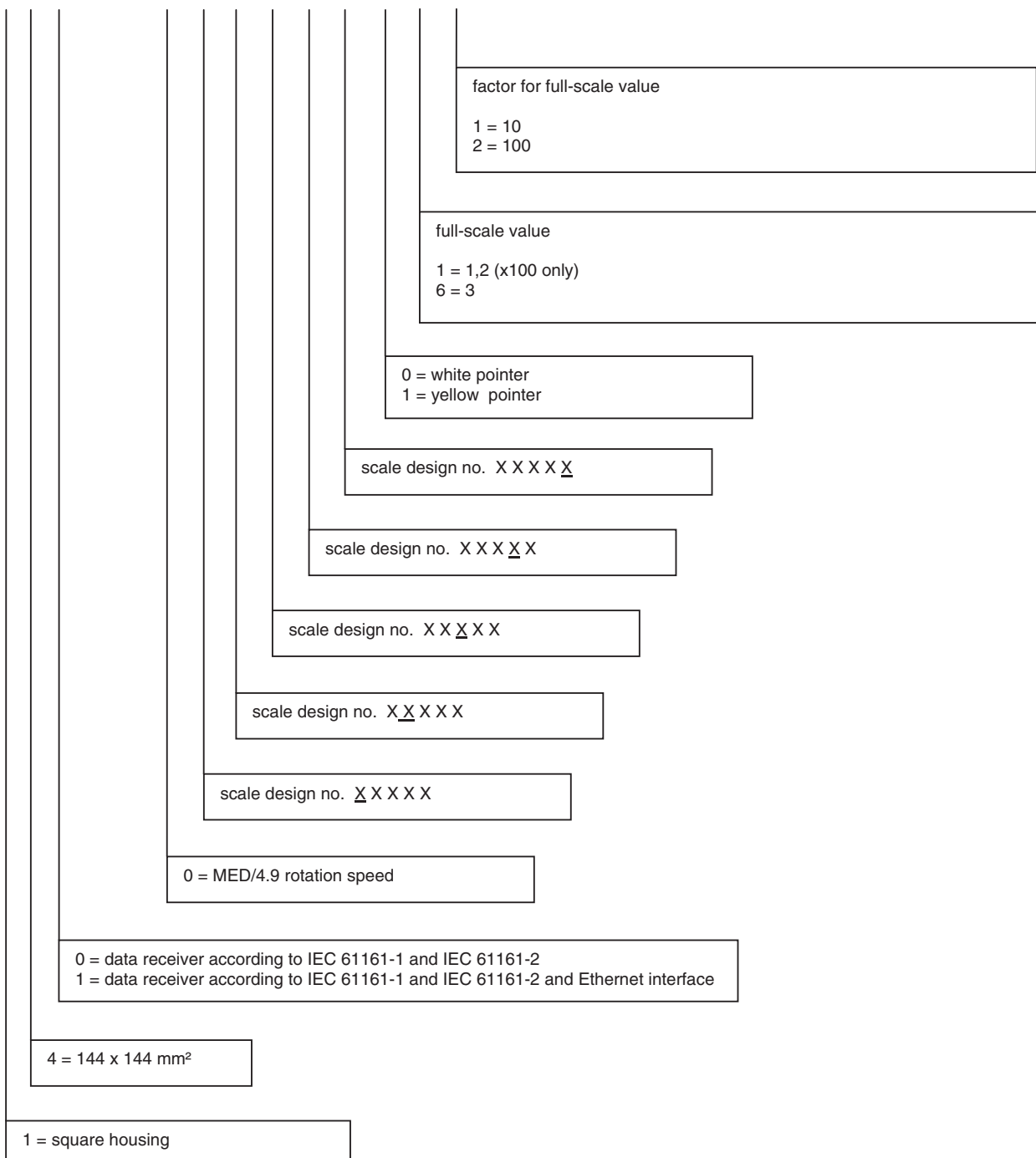
Q96 scale design no.: 09505
Q144 scale design no.: 10505
without trend LEDs



Q96 scale design no.: 09506
Q144 scale design no.: 10506
with trend LEDs

SERANA-Q MED/4.9 rotation speed (MED certificate)

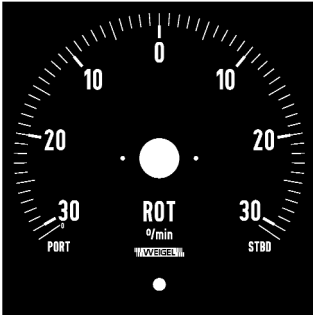
210 . 1 4 x . 0 x x x x x x x x



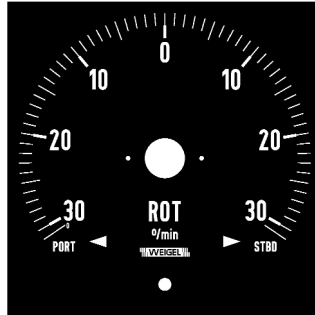


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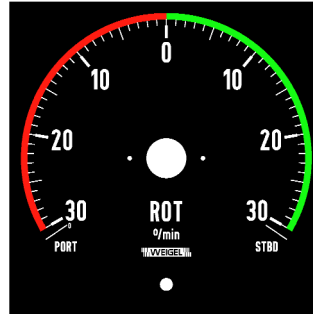
scale design MED/4.9 rotation speed
exemplary depiction of size SERANA-Q 144



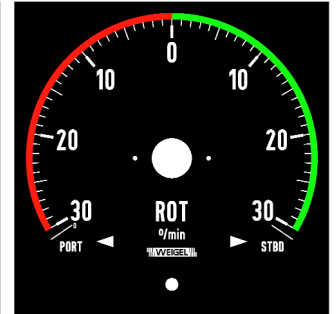
Q144 scale design no.: 10001
without trend LEDs



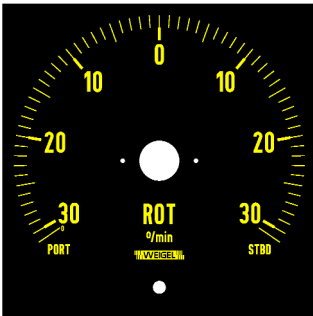
Q144 scale design no.: 10002
with trend LEDs



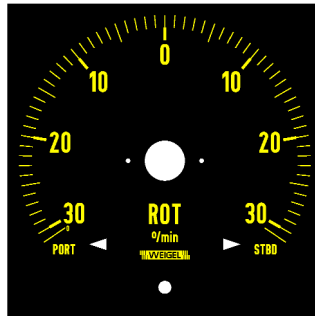
Q144 scale design no.: 10007
without trend LEDs



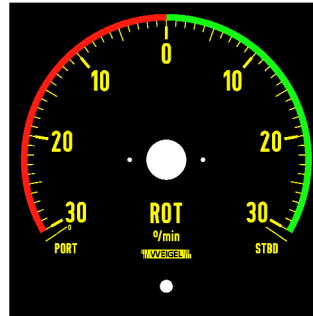
Q144 scale design no.: 10008
with trend LEDs



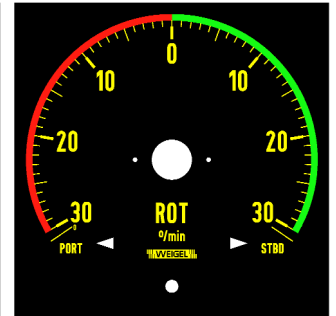
Q144 scale design no.: 10003
without trend LEDs



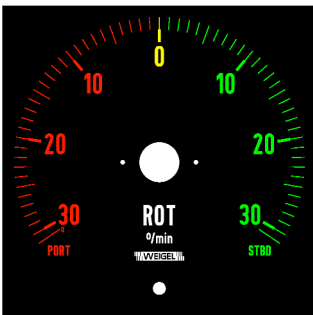
Q144 scale design no.: 10004
with trend LEDs



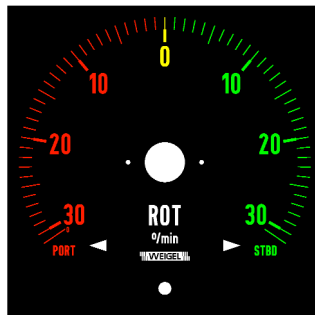
Q144 scale design no.: 10009
without trend LEDs



Q144 scale design no.: 10010
with trend LEDs



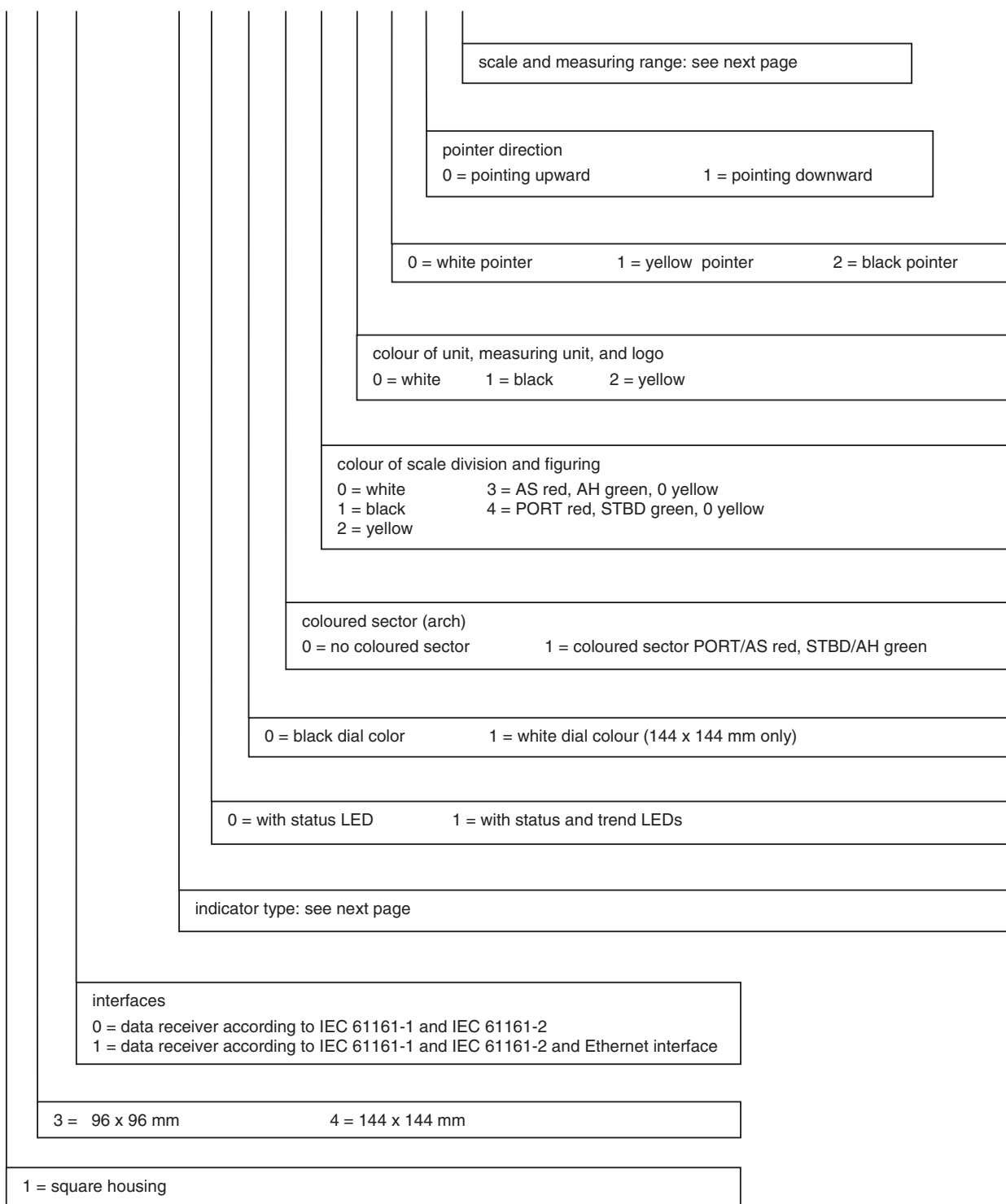
Q144 scale design no.: 10005
without trend LEDs



Q144 scale design no.: 10006
with trend LEDs

Serial analogous indicator SERANA-Q (Type Approval)

211 . 1 x x . x x x x x x x x x





Serial Analogous Indicators

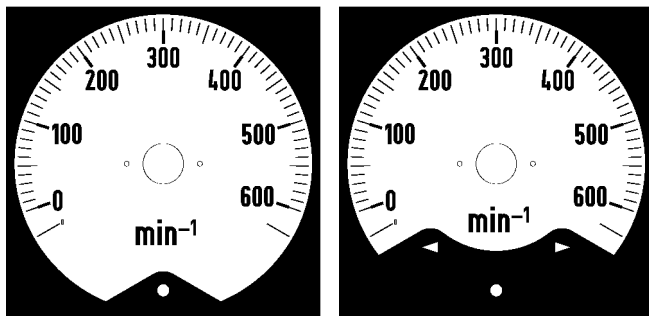
Serial analogous indicator SERANA-Q (Type Approval)

211 . 1 x x . x x x x x x x x x

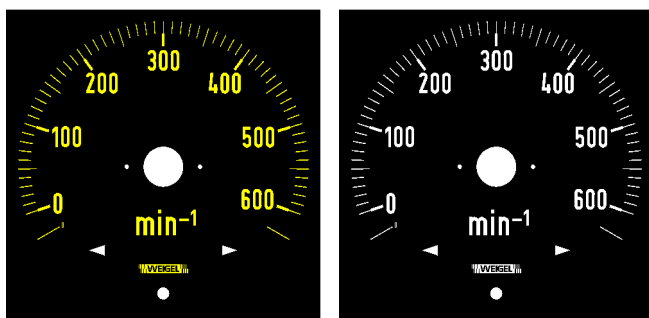
serial analogous indicator type
0 = rotation speed
1 = rudder angle
2 = propeller speed
3 = engine speed
4 = shaft speed
5 = depth
6 = speed (water speed)
7 = water temperature
8 = not used
9 = not used
A = not used
B = not used

scale and measuring range		
0 = rotation speed	scale: 30...0...30	°/min
1 = rotation speed	scale: 120...0...120	°/min
2 = rotation speed	scale: 300...0...300	°/min
3 = rudder angle	scale: 45...0...45	degrees
4 = rudder angle	scale: 70...0...70	degrees
5 = propellerspeed	scale: 350...0...350	min ⁻¹
6 = engine speed	scale: 0...1500	min ⁻¹
7 = shaft speed	scale: 0...600	min ⁻¹
8 = shaft speed	scale: 600...0...600	min ⁻¹
9 = depth below keel	scale: 0...1000 (log)	m
A = speed (water speed)	scale: -5...40	kts
B = speed (water speed)	scale: -5...25	kts
C = water temperature	scale: -5...35	°C
D = not used		
E = not used		
F = not used		

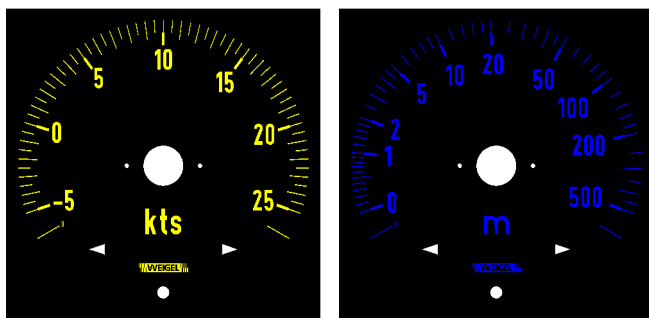
examples for scales for Type Approval



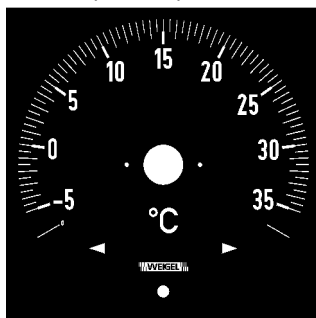
rotation speed, scale design white without or with trend LEDs



rotation speed, scale design black with yellow or white scale



rotation speed, depth



temperature

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– specifications subject to change without notice; date of issue 03/18 –



Electronics from mikrolab GmbH, D-90766 Fürth