Data Sheet

418.D.101.10

Serial Analogous Indicators

SERANA–Q 96
SERANA–Q 144

WEIGEL

Electronics from mikrolab GmbH, D–90766 Fürth

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 ±30° ➧
panel fixing	4 screw clamps
panel thickness	2 ... 40 mm
terminals	plugable 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	$\square 92^{+0.8}$	$\square 138^{+1}$
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	dimmable 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	

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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

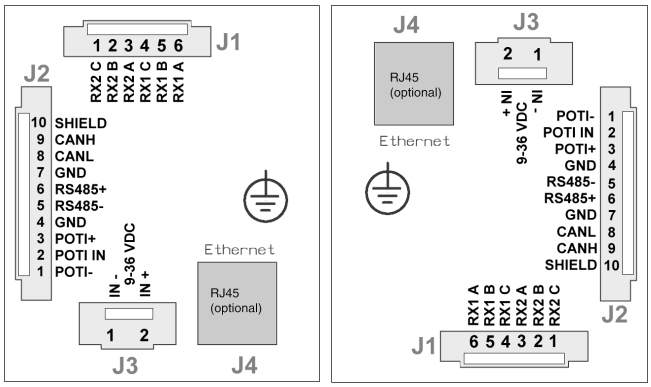
swivel frame case for SERANA–Q 144

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

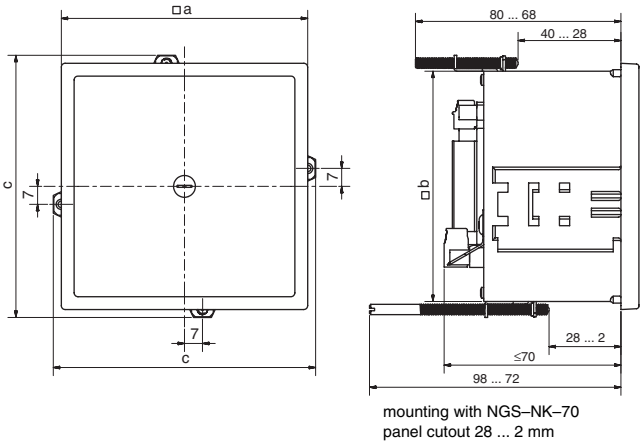
No.	Terminal	J2: Interfaces
1	POTI–	– potentiometer for brightness adjustment
2	POTI IN	wiper potentiometer for brightness adjustment
3	POTI+	+ potentiometer for brightness adjustment
4	GND	RS485 ground
5	RS485–	–RS485 interface (for service/calibration)
6	RS485+	+RS485 interface (for service/calibration)
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**

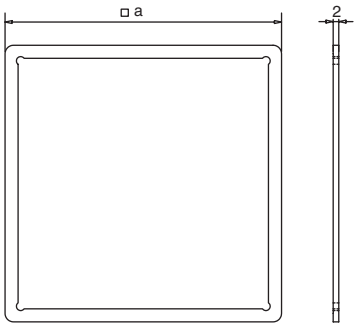
Dimensions

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

Swivel frame housing

The **swivel frame housings** for external installation are suitable for use with the **SERANA** devices, available for sizes 96 mm and 144 mm. The housings are made of stainless steel and black powder-coated. Optionally, the housings are available with a built-in dimmer.

A housing can only be ordered with a SERANA device and it will be completely mounted and wired with a 3 m long connection cable.

The unit is tested according to enclosure code ”Exposed.

A standing or suspended mounting is possible.

External dimmers for navigation devices are available for control panel mounting or with mounting case.

Both variants are approved in the DNV GL certificates of the **SERANA** devices.

dimming variants

When ordering, it must be stated, how the devices shall be dimmed because the wiring and the terminal assignment depends on it.

The devices in the swivel frame housing can be dimmed as follows:

– external dimmer 1–10 kΩ
– external dimming master for dimming of several devices
– via NMEA interface
– via CAN interface
– built-in dimmer in conjunction with NMEA or CAN possible

technical data

enclosure code	”Exposed” also comprises IP X6
material of case	V4A, black powder-coated

standards

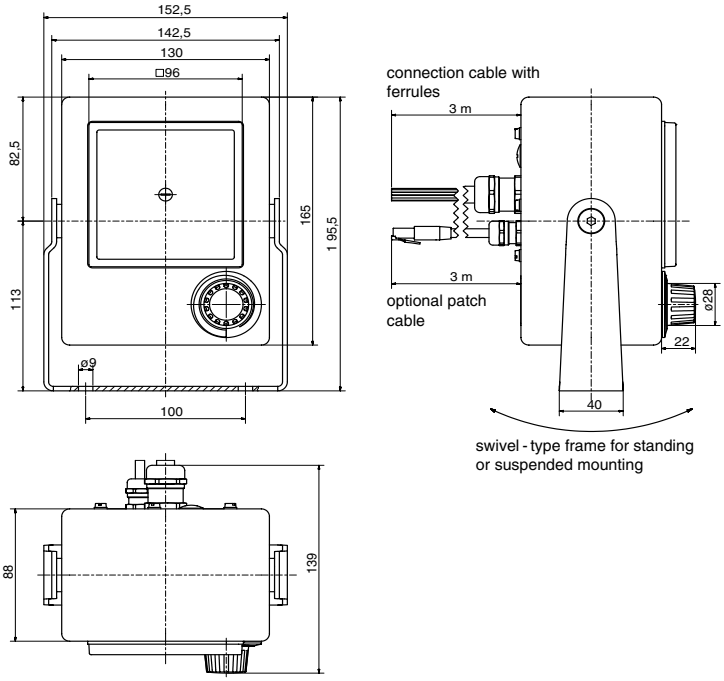
Maritime navigation and radiocommunication equipment and systems –

IEC 60945 : 2002	General requirements – Methods of testing and required test results 8.7 Vibration, 8.8 Rain and sea spray

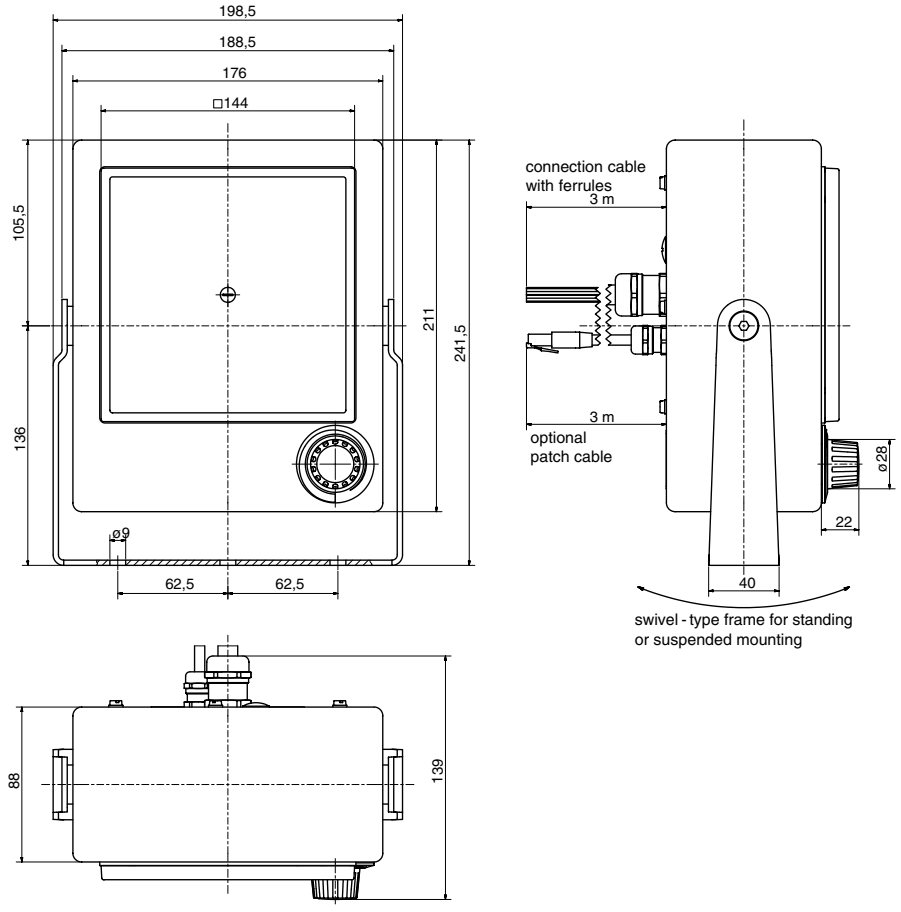
ordering example

SRG 96 with Serana article No. xxxx and specification of the dimming variant

Dimensions SRG 96



SRG 144

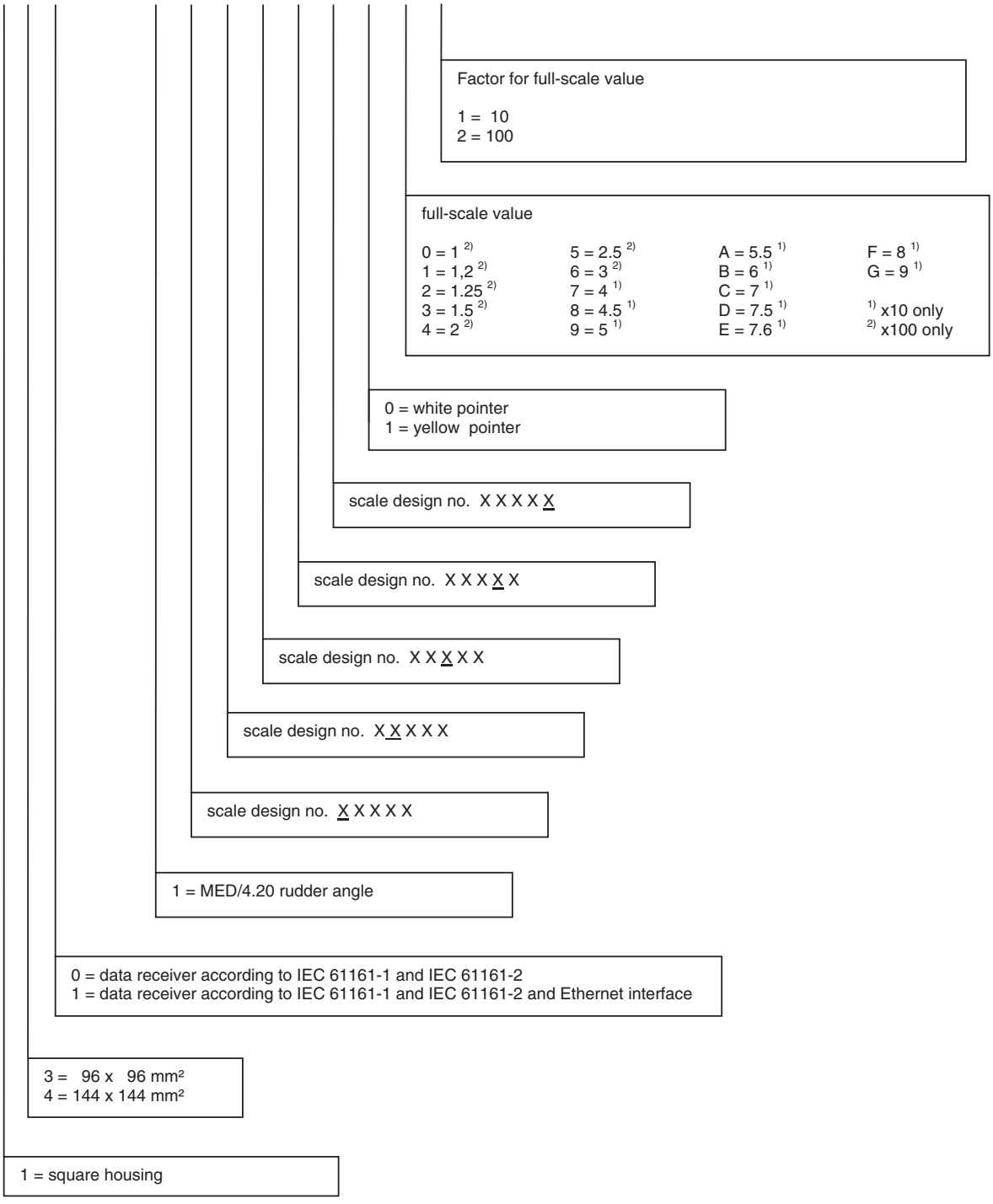


(dimensions in mm)

Article Number Code

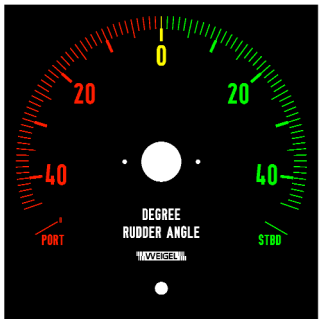
SERANA–Q MED/4.20 rudder angle indicator (MED certificate)

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

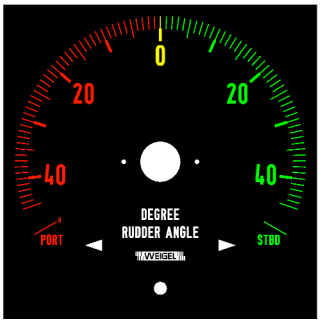


scale design MED/4.20 rudder angle indicator

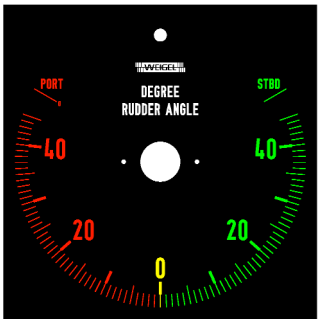
exemplary depiction of size SERANA–Q 144
scale division 40° to 69°
size SERANA–Q 96 without logo



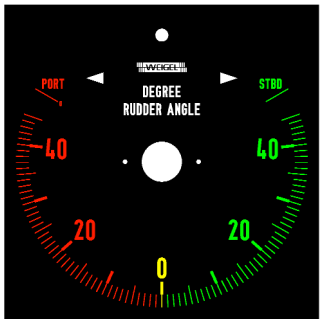
Q96 scale design no.: 09105
Q144 scale design no.: 10105
without trend LEDs



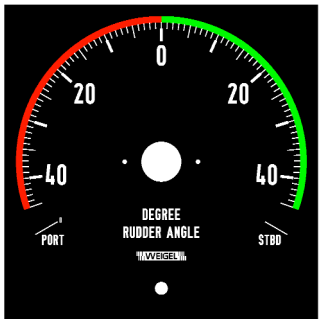
Q96 scale design no.: 09106
Q144 scale design no.: 10106
with trend LEDs



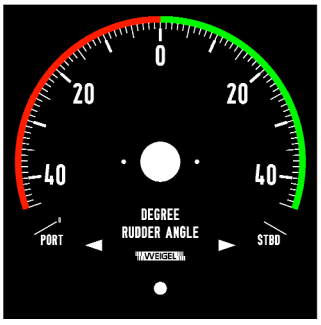
Q96 scale design no.: 09305
Q144 scale design no.: 10305
without trend LEDs



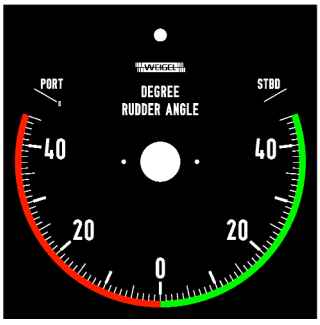
Q96 scale design no.: 09306
Q144 scale design no.: 10306
with trend LEDs



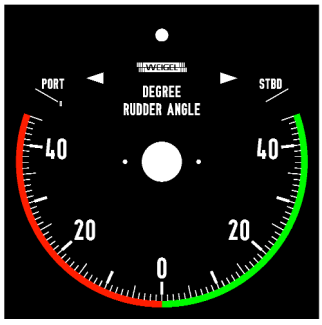
Q96 scale design no.: 09107
Q144 scale design no.: 10107
without trend LEDs



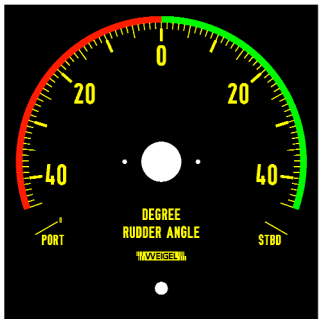
Q96 scale design no.: 09108
Q144 scale design no.: 10108
with trend LEDs



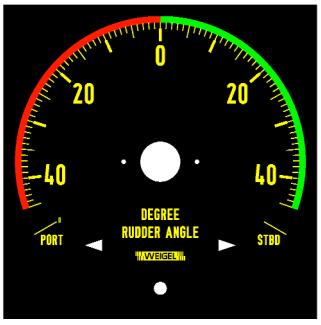
Q96 scale design no.: 09307
Q144 scale design no.: 10307
without trend LEDs



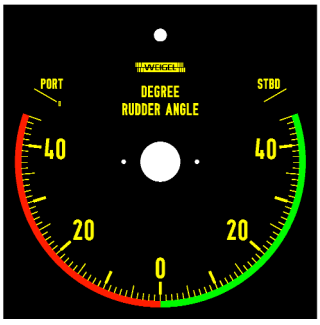
Q96 scale design no.: 09308
Q144 scale design no.: 10308
with trend LEDs



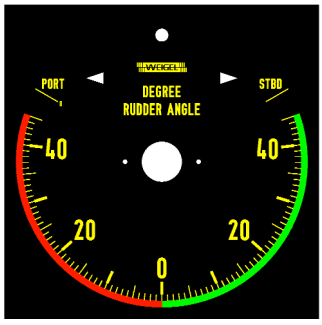
Q96 scale design no.: 09109
Q144 scale design no.: 10109
without trend LEDs



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



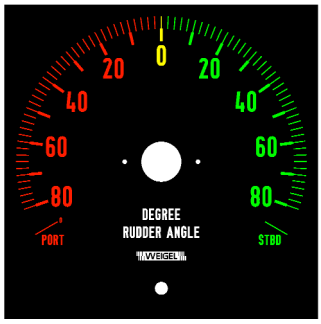
Q96 scale design no.: 09309
Q144 scale design no.: 10309
without trend LEDs



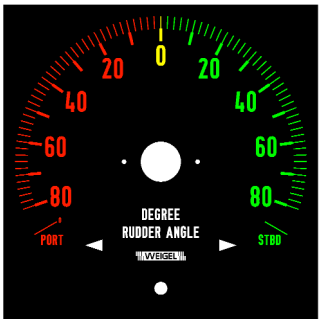
Q96 scale design no.: 09310
Q144 scale design no.: 10310
with trend LEDs

Serial Analogous Indicators

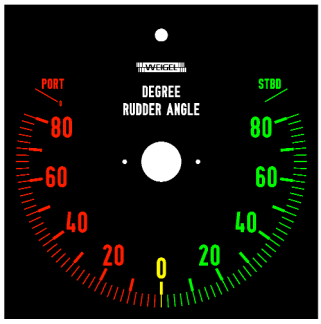
scale design MED/4.20 rudder angle indication
exemplary depiction of size SERANA–Q 144
scale division 70° or bigger
size SERANA–Q 96 without logo



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



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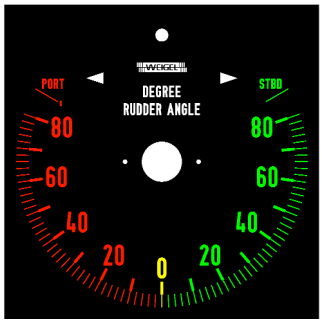
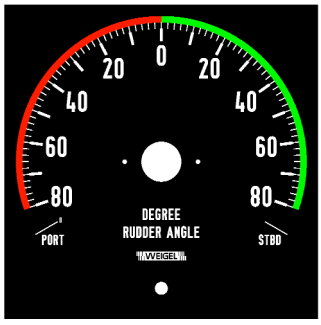
Q144 scale design no.: 10405
without trend LEDs

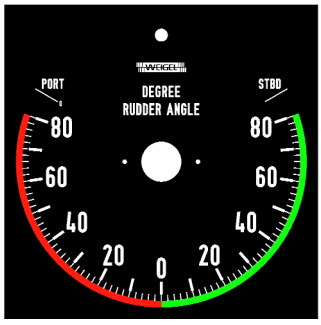


Q96 scale design no.: 09406
Q144 scale design no.: 10406
with trend LEDs

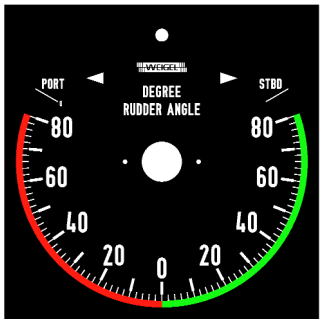


Q96 scale design no.: 09207
Q144 scale design no.: 10207
without trend LEDs

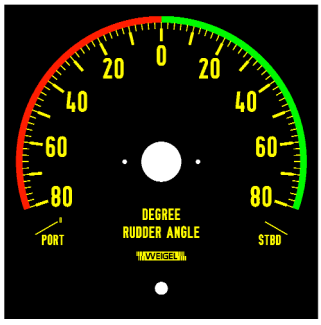
Q96 scale design no.: 09208
Q144 scale design no.: 10208
with trend LEDs



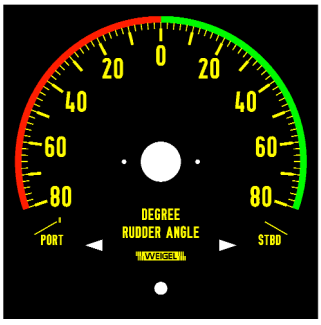
Q96 scale design no.: 09407
Q144 scale design no.: 10407
without trend LEDs



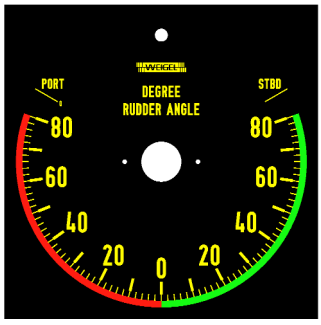
Q96 scale design no.: 09408
Q144 scale design no.: 10408
with trend LEDs



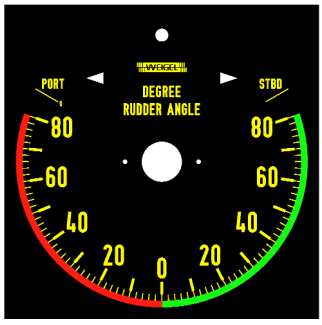
Q96 scale design no.: 09209
Q144 scale design no.: 10209
without trend LEDs



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

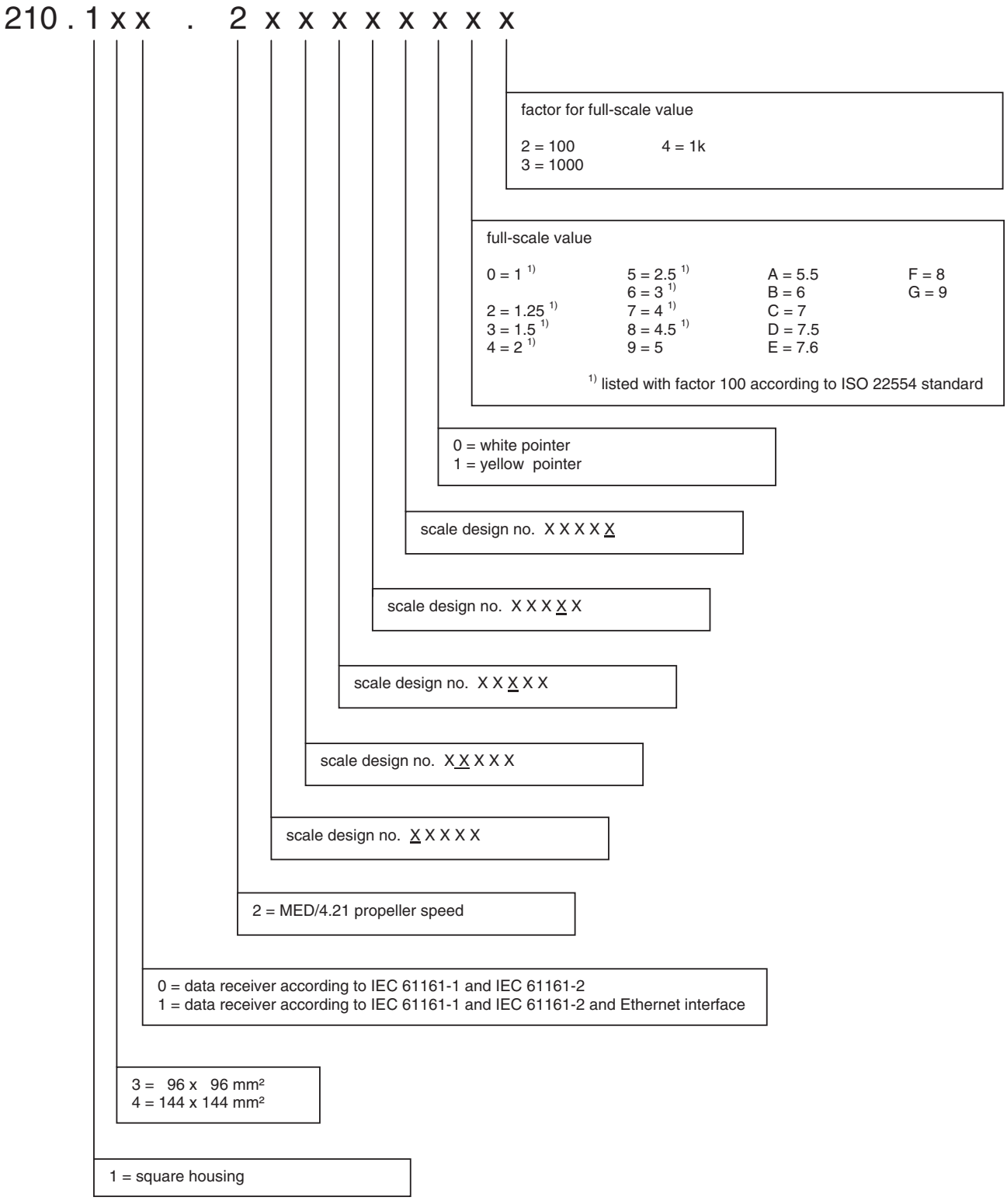


Q96 scale design no.: 09409
Q144 scale design no.: 10409
without trend LEDs

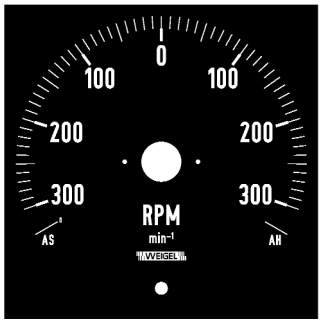


Q96 scale design no.: 09410
Q144 scale design no.: 10410
with trend LEDs

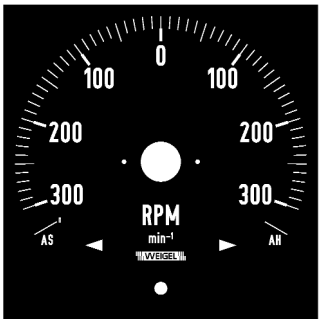
SERANA–Q MED/4.21 propeller speed (MED certificate)



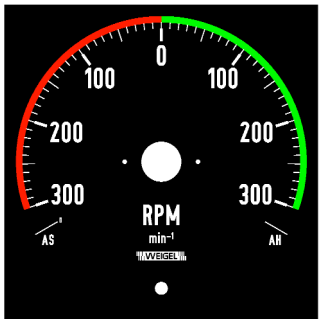
scale design MED/4.21 propeller speed
exemplary depiction of size SERANA–Q 144
size SERANA–Q 96 without logo



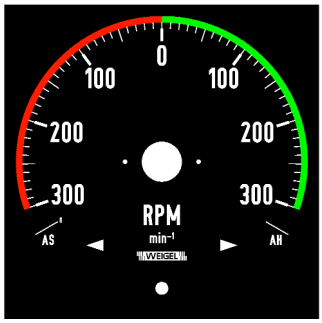
Q96 scale design no.: 09501
Q144 scale design no.: 10501
without trend LEDs



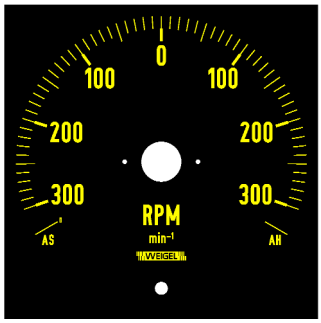
Q96 scale design no.: 09502
Q144 scale design no.: 10502
with trend LEDs



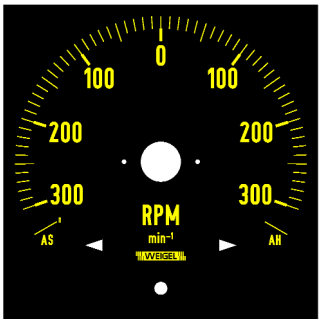
Q96 scale design no.: 09507
Q144 scale design no.: 10507
without trend LEDs



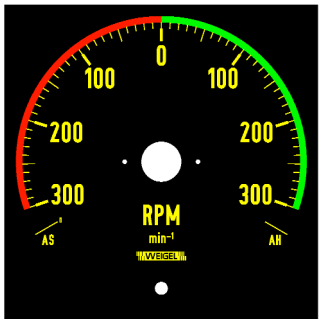
Q96 scale design no.: 09508
Q144 scale design no.: 10508
with trend LEDs



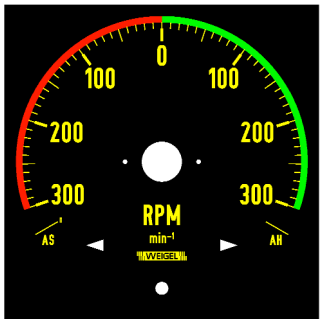
Q96 scale design no.: 09503
Q144 scale design no.: 10503
without trend LEDs



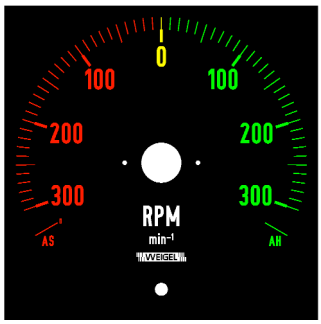
Q96 scale design no.: 09504
Q144 scale design no.: 10504
with trend LEDs



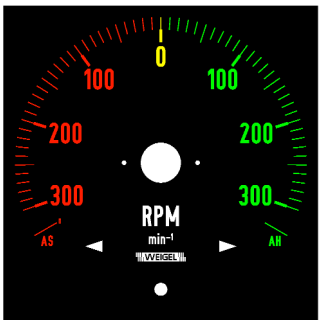
Q96 scale design no.: 09509
Q144 scale design no.: 10509
without trend LEDs



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

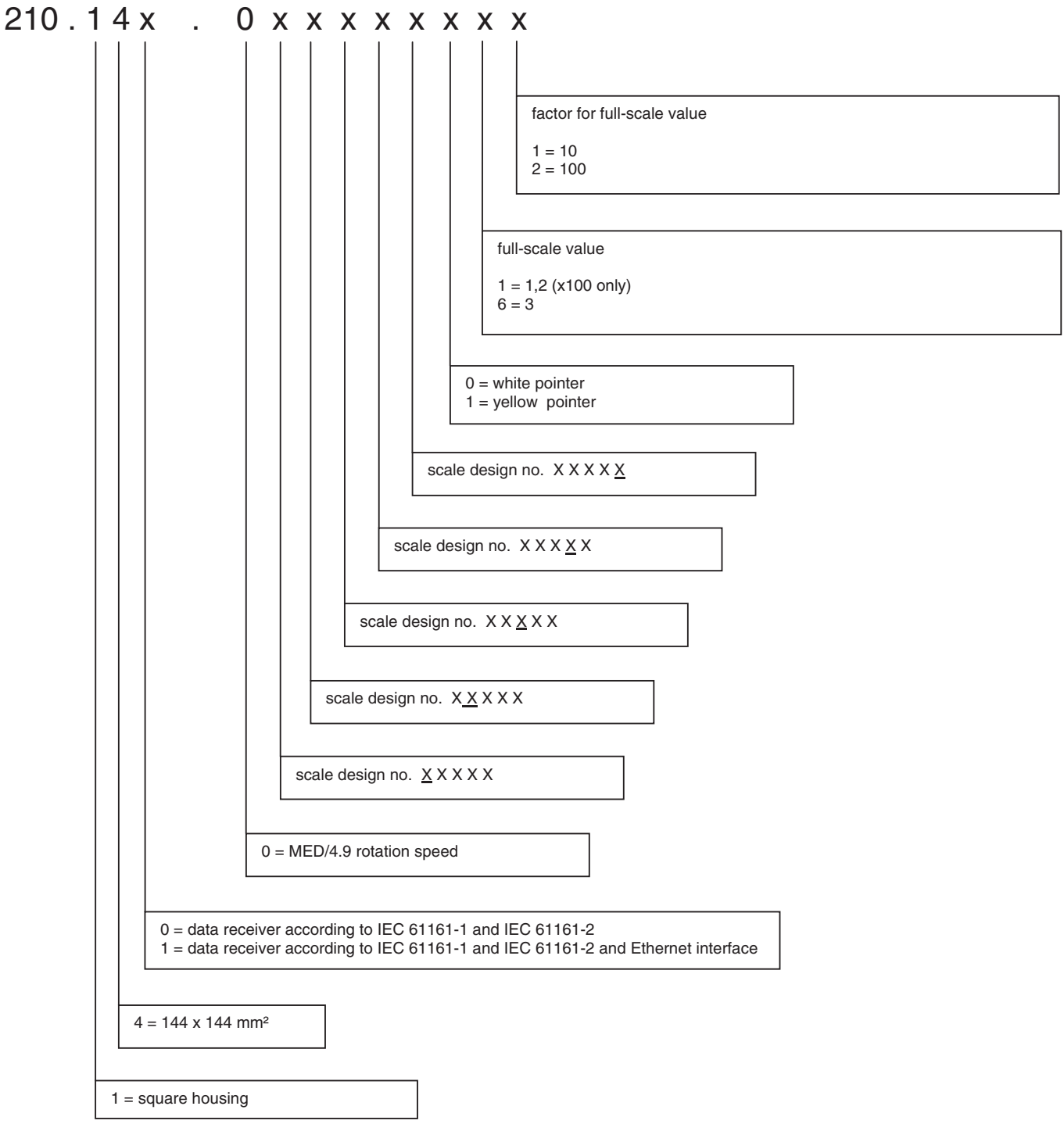


Q96 scale design no.: 09505
Q144 scale design no.: 10505
without trend LEDs

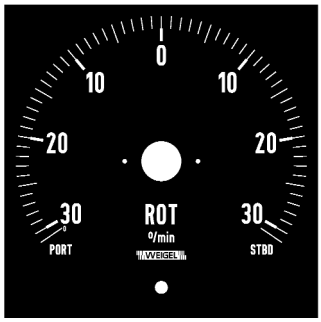


Q96 scale design no.: 09506
Q144 scale design no.: 10506
with trend LEDs

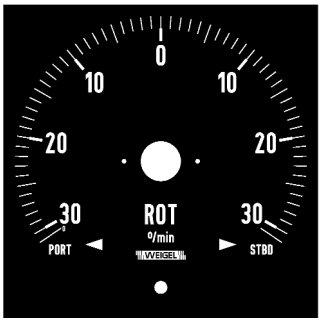
SERANA–Q MED/4.9 rotation speed (MED certificate)



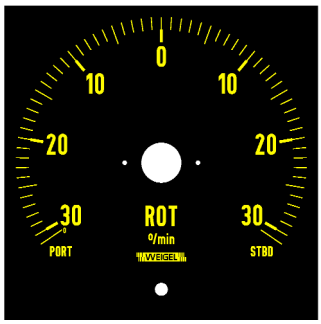
scale design MED/4.9 rotation speed
exemplary depiction of size SERANA–Q 144



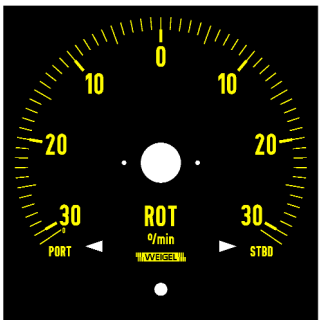
Q144 scale design no.: 10001
without trend LEDs



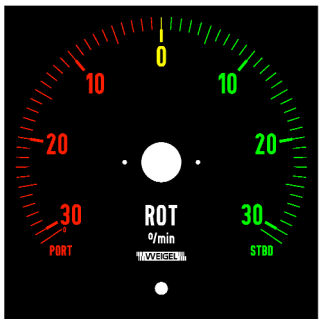
Q144 scale design no.: 10002
with trend LEDs



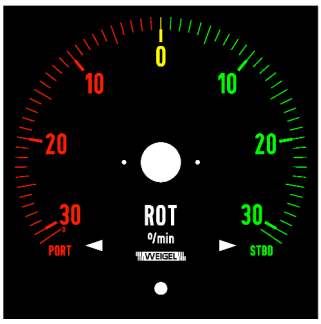
Q144 scale design no.: 10003
without trend LEDs



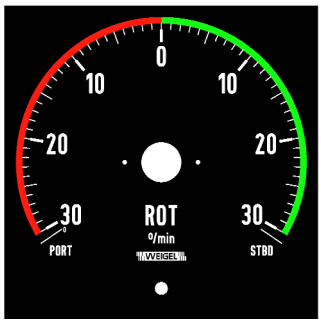
Q144 scale design no.: 10004
with trend LEDs



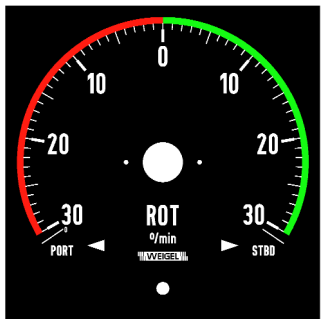
Q144 scale design no.: 10005
without trend LEDs



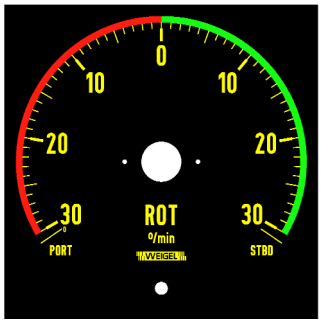
Q144 scale design no.: 10006
with trend LEDs



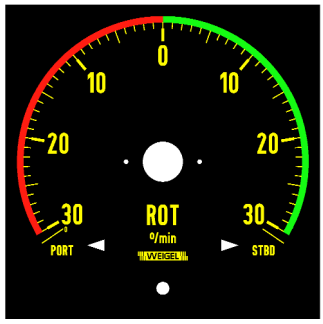
Q144 scale design no.: 10007
without trend LEDs



Q144 scale design no.: 10008
with trend LEDs



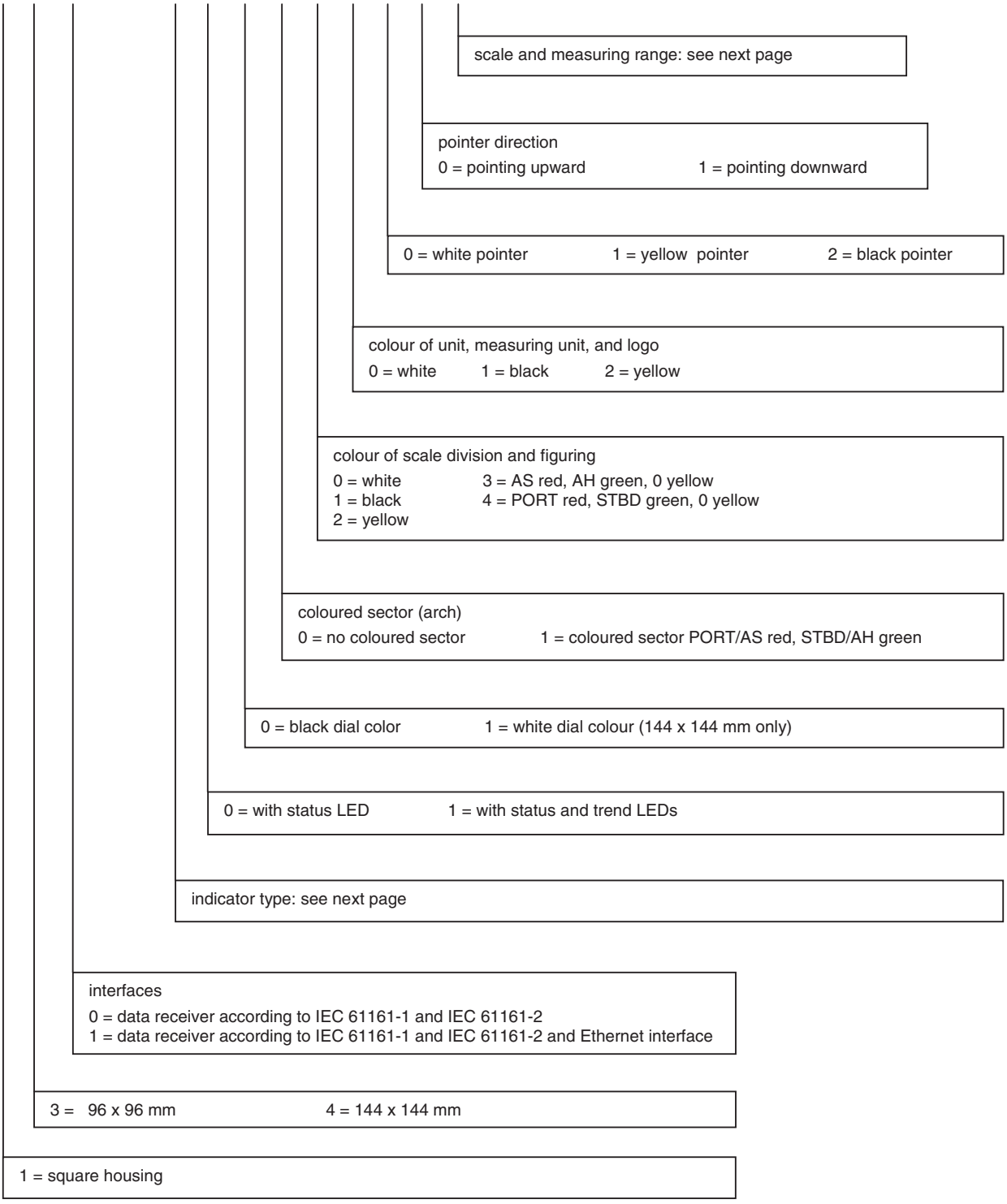
Q144 scale design no.: 10009
without trend LEDs



Q144 scale design no.: 10010
with trend LEDs

Serial analogous indicator SERANA–Q (Type Approval)

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



Data Sheet

Serial Analogous Indicators

Serial analogous indicator SERANA–Q (Type Approval)

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

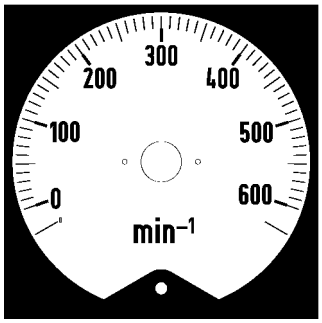
serial analogous indicator type

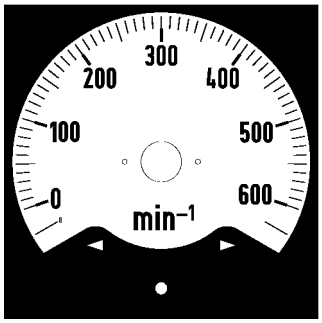
0 = rotation speed
1 = rudder angle
2 = propeller speed
3 = engine speed
4 = shaft speed
5 = depth
6 = speed (water speed)
7 = water temperature
8 = not used
9 = not used
A = not used
B = not used

scale and measuring range

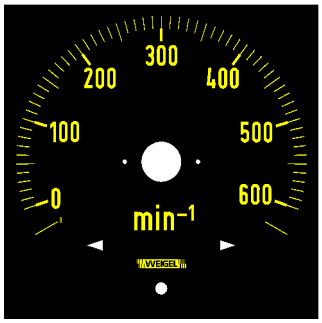
0 = rotation speed	scale: 30…0…30	°/min
1 = rotation speed	scale: 120…0…120	°/min
2 = rotation speed	scale: 300…0…300	°/min
3 = rudder angle	scale: 45…0…45	degrees
4 = rudder angle	scale: 70…0…70	degrees
5 = propellerspeed	scale: 350…0…350	min^{-1}
6 = engine speed	scale: 0…1500	min^{-1}
7 = shaft speed	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		

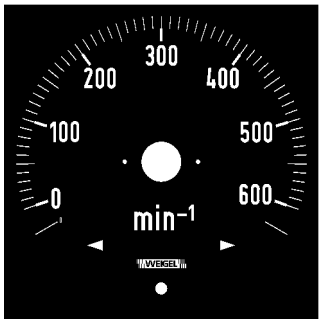
examples for Scales for Type Approval



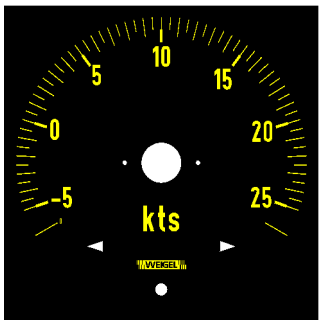


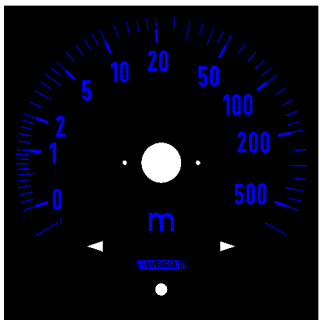
rotation speed, scale design white without or with trend LEDs



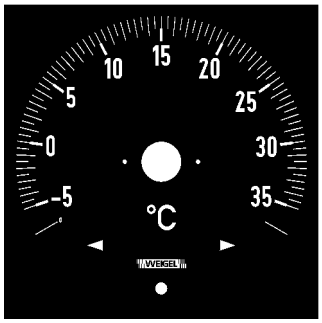


rotation speed, scale design black with yellow or white scale





rotation speed, depth



temperature

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– specifications subject to change without notice; date of issue 12/18 –

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