User Reference Manual

DuraMON G-Line

DuraMON 19” G-Line
DuraMON 24” G-Line
DuraMON 26” G-Line
DuraMON 27” G-Line
DuraMON 32” G-Line

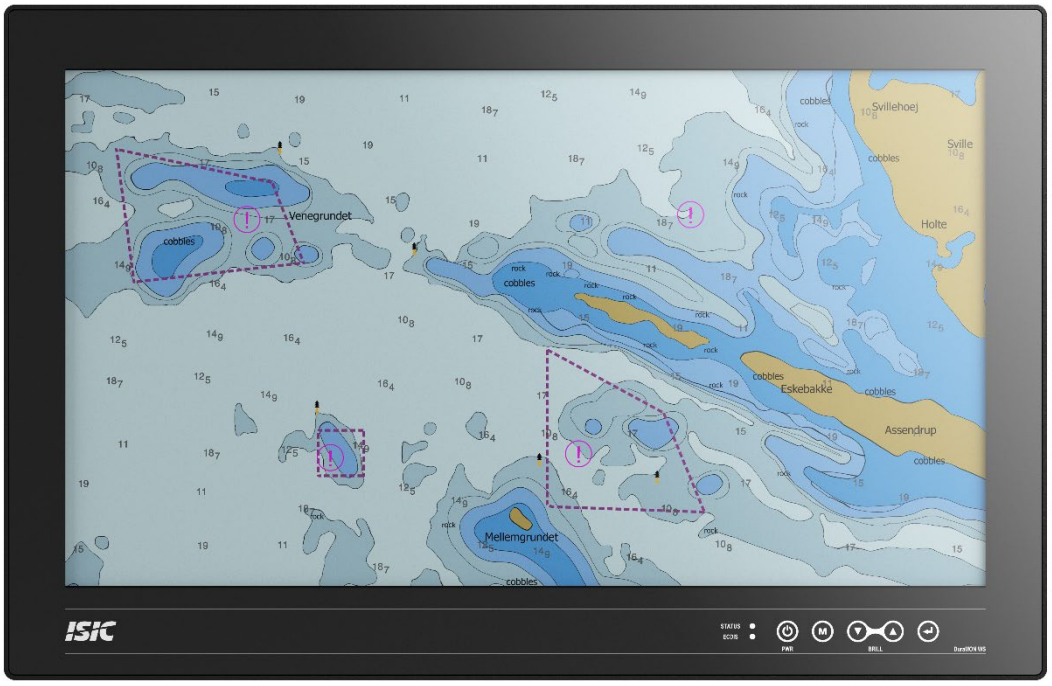

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Image sticking: If the monitor is operated with static images (logo's etc.) it will inevitably lead to images sticking on the display. This is not a permanently situation and can be removed by operating the monitor with a video that is created for this purpose.

FCC Warning

Computing devices and peripherals generate and radiate radio frequency energy, and if not installed and used in accordance with the instructions advised by ISIC A/S, it may cause interference to radio communication.

The DuraMON series, manufactured by ISIC A/S, is designed to comply with the emerging generic EEC standards, that cover applications in maritime environment.

Classification

The monitor is classified as "protected from the weather" according to IEC 60945 (former class b).

Approvals

Approval according to IACS E10 and IEC 60945, Maritime navigation and radio communication equipment and systems – General requirements.
ECDIS IEC 61174
Radar IEC 62288
Radar IEC 62388

ISIC A/S is complying with the WEEE directive within the European Union, stating that electronic and electric products must be collected separately.
Products are marked according to the directive.

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1 Features

Congratulations on your purchase of a DuraMON G-Line. This short form manual is designed to get you started working with your new DuraMON G-Line.

The DuraMON G-Line series of monitors are all made as rugged monitors especially designed for the demanding operating conditions at sea.

The DuraMON G-Line series are tested for full compliance to marine-standards IACS E10 and IEC 60945.
The monitor comes with excellent brightness and contrast levels that, together with wide viewing angles, ensure a good readability thus making it very eye-friendly. For the best picture quality, always use a double shielded cable with ferrites, like the one supplied with the monitor.

Direct dimming control (1cd to 100%) from UP/DOWN buttons.
Full settings control via menu or serial link.
Support for DDC
Anti-Reflective coated G-Line.
IP65 protected front.

Multiple connections to cover the widest range of signal sources:
Display Port
DVI-D
VGA

Optional Touch Screen available, but has to be ordered with the monitor.

2 General considerations on Installation and Operation

The DuraMON G-Line is designed to work at conditions according to IEC 60945. However, keeping the temperature and vibration level at a minimum will extend the life time of the product. ISIC recommend operating this product at normal room temperature (20-25 °C), with the lowest level of vibration and humidity.

Installation of the DuraMON G-Line

In order to obtain the best possible operating conditions, please note the following precautions.

- Room for cooling.
  When designing the cabinet/console for the DuraMON G-Line, please ensure that air can flow freely around the cabinet, in order to avoid any unnecessary rise in temperature. If it is not possible to have an adequate natural airflow, use a fan to force the airflow to be higher.

- Mounting positions
  To obtain adequate cooling by convection ISIC recommends that the DuraMON G-Line is mounted at least 30 degrees from horizontal. If this is not possible, forced cooling must be applied directly to the unit in order not to overheat it.

- Sunlight
  If the unit can be exposed to direct sunlight, there is a potential risk that the unit can be overheated. Please take measures to prevent direct sunlight. Do also consider forced cooling on the back of the unit.

Operation of the DuraMON G-Line

To ensure that colors and luminance on the display are correct in ECDIS applications, do not use the monitor until the warm-up period has completed.

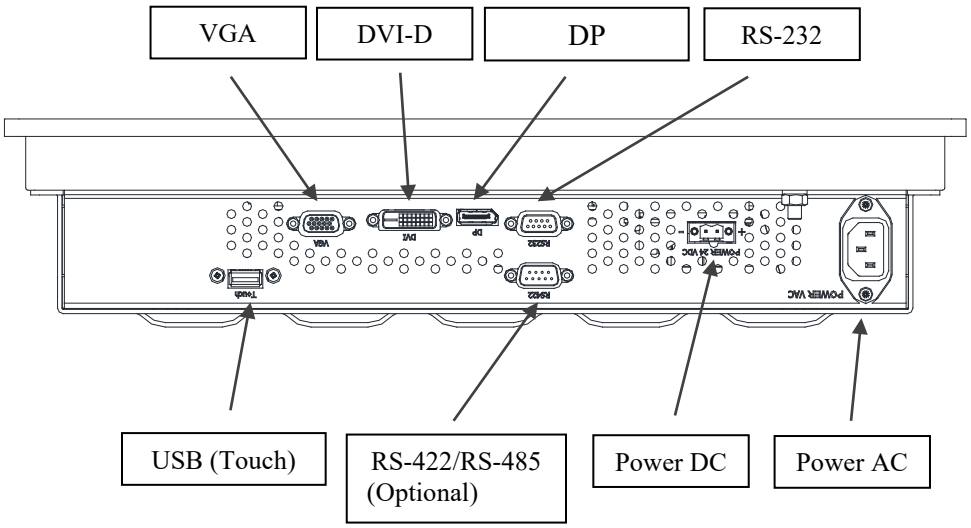
The warm-up period is as follows:

	Day mode	Dusk mode	Night mode
DuraMON 19" G-Line	30 min	30 min	30 min
DuraMON 24" G-Line	30 min	30 min	30 min
DuraMON 26" G-Line	30 min	30 min	30 min
DuraMON 27" G-Line	30 min	30 min	30 min
DuraMON 32" G-Line	30 min	30 min	30 min

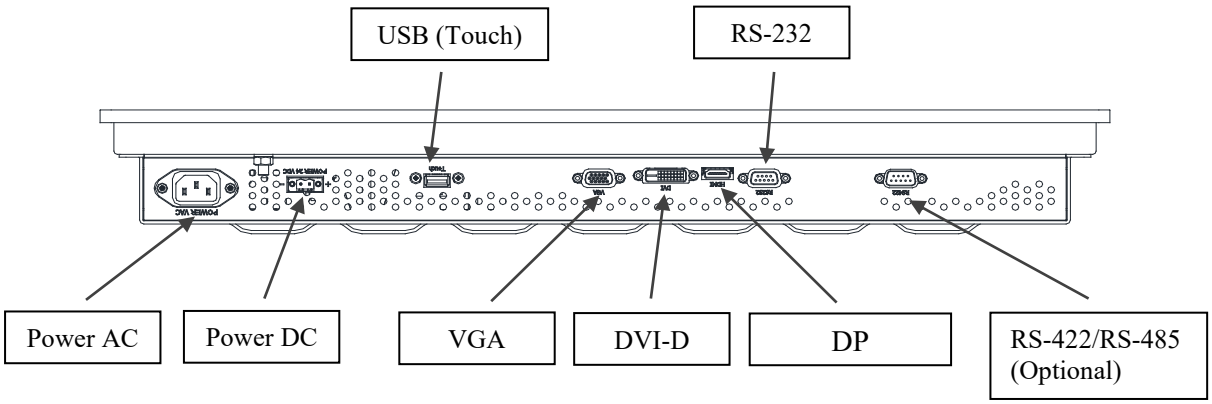
3 DuraMON G-Line connections

Below is a view of optional connections to the monitor. The default inputs are: power, RS-232, DP, DVI and VGA.

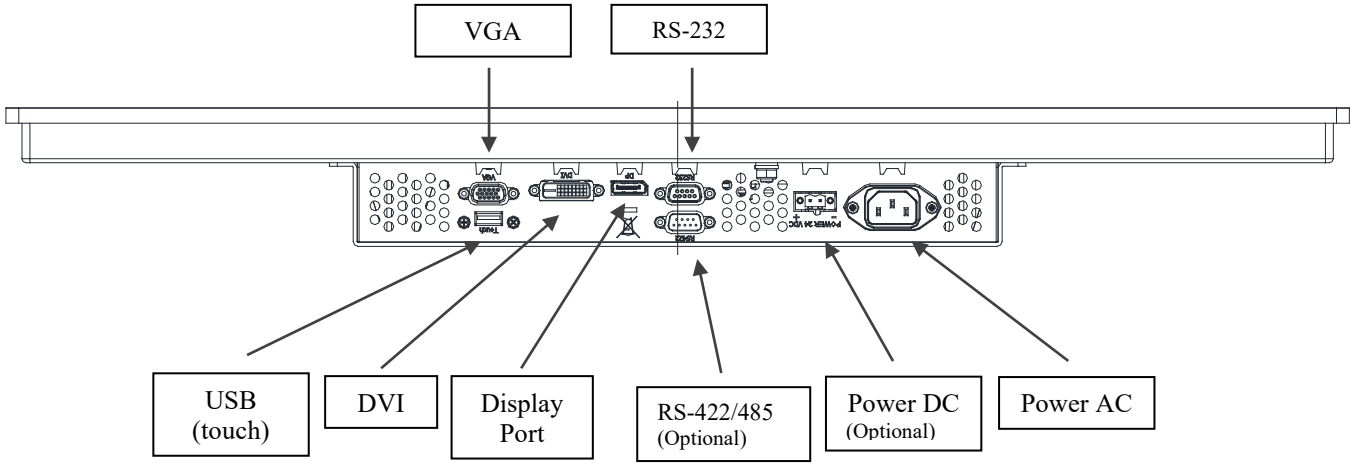
3.1 DuraMON 19" G-Line:



3.2 DuraMON 24" G-Line / DuraMON 26" G-LINE:



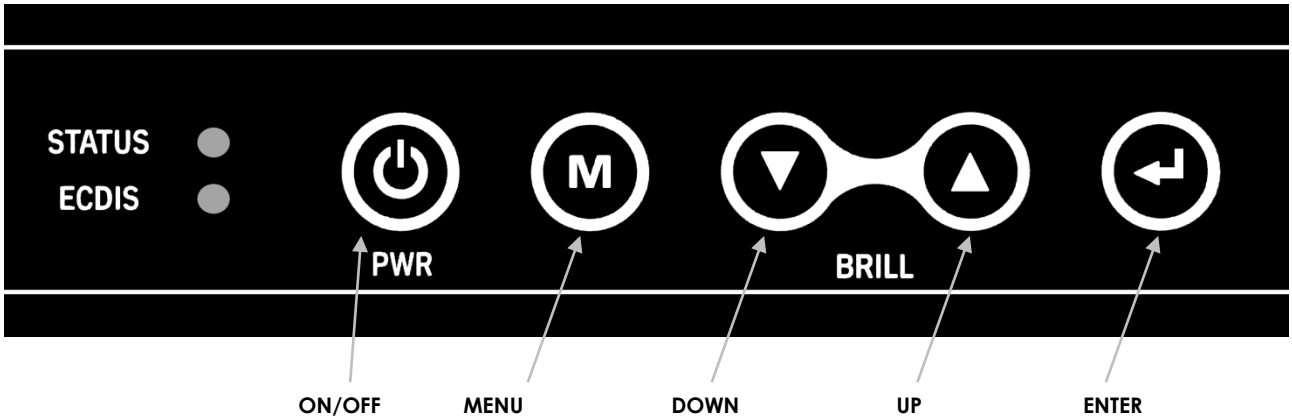
3.3 DuraMON 27” / 32” G-Line:



To connect the DC power connector you need a screw driver.
Only use multicore cables from AWG16 to AWG12 (1.0 mm^2 to 4 mm^2).
DC connector: Weidmüller, BLZP 5.08HC/02/180F SN BK BX, 1944330000
AC Connector: IEC 60320 type C13

4 DuraMON G-Line front panel controls (ECDIS and Radar)

The front panel is illuminated and will follow the brightness level of the monitor backlight.



STATUS:
This LED will illuminate green when the monitor is powered on and red when the monitor is powered down. The LED will be red if no active signal is found.

ECDIS:
The LED will ONLY illuminate green when the backlight level is at calibrated setting AND ONLY on an ECDIS calibrated port. If the backlight level isn't at calibrated setting OR an uncalibrated port is used the LED will not illuminate.

ECDIS (Old units):
The LED will ONLY illuminate orange when the backlight level is at calibrated setting AND ONLY on an ECDIS calibrated port.

ON/OFF:
This key is used to turn the product on or off. Pressing it will turn the power on, while holding it pressed down for 5 seconds will turn the power off. The status light will change from green to red to indicate it's powered down. It is important to notice that, when powered off, the product still consumes some power from the mains. To cut off the power from the product it is necessary to unplug its power cord from the mains.
If there is no active signal, the monitor will go to suspend mode until an active signal is detected. While the monitor is in suspend mode, the status light will blink.

Menu:
To activate the OSD menu, press "Menu" and "Enter" buttons at the same time.
See Popup Menu section for details.

UP/DOWN:
Used to adjust backlight or to navigate and adjust settings in menus. Pressing UP and DOWN together will restore the backlight level to the last selected ECDIS mode by the serial link. (See document 04924-001 for protocol details).

ENTER:
This key is used to confirm and to enter the advanced OSD by pressing ENTER and thereafter MENU while holding ENTER pressed.

5 Serial connection pin-out

Pin	RS-232 SUB-D 9-pol female	RS-422/RS-485 (4 wire) (Optional) SUB-D 9-pol male	RS-485 (2 wire) (Optional) SUB-D 9-pol male
1			
2	TX	B (RX-)	B (D-)
3	RX	Y (TX+)	
4			
5	GND	GND	GND
6			
7		A (RX+)	A (D+)
8		Z (TX-)	
9			

6 Technical specifications DuraMON G-Line

DuraMON G-Line I/O

Video inputs:	**1 x VGA** **1 x DVI-D** **1 x Display Port 1.2** **Recommended resolution for:** **19" is 1280x1024 (5/4)** **24", 27" and 32" is 1920x1080 (16/9)** **26" is 1920x1200 (max refresh rate is 60 Hz @ 1920x1200)** Generally all VESA compatible video modes are supported. Special modes supported on request.
Control inputs:	**1 x RS-232 – for remote control.** **1 x RS-422/RS-485 – for remote control / daisy-chain (optional).** **1 x USB for touch sensor (optional).** **1 x Buzzer, (75-85 dB(A) / 1m) (activated by serial command)**

DuraMON G-Line Power Supply Options

Standard:	**100-240 VAC 50/60Hz Nominal Marine**
Optional:	**24 VDC Nominal Marina (available with both AC and DC simultaneously)**

DuraMON G-Line Environmental Conditions

Operating Temperature:	**-15 to 55 °C**
Storage Temperature:	**-25 to 70 °C**
Relative Humidity:	**8 to 90 %**

DuraMON G-Line Approvals

Marine:	**IEC 60945 & IACS E10**
ECDIS, Radar:	**IEC 61174, IEC 62288, IEC 62388**
Type Approvals:	***For marine class approvals – see www.isic-systems.com***

6.1 Specification DuraMON 19" G-Line

Resolution:	**1280 x 1024**
Active Area	**376.320mm x 301.056mm (19.0" diagonal)**
Pixel Pitch:	**0,294 mm x 0.294 mm**
View angle:	**89° (L/R/T/B) (typical)**
Viewing distance:	**1011 mm minimum**
Luminance:	**300 cd/m² (typical)**
Contrast ratio:	**2000:1 (typical)**
Colors:	**16,7 mill. (24-bit)**
Response Time:	**20 ms (GtG) (typical)**
Window:	**Anti-Reflective coated front G-Line**
Protection:	**IP65 front – IP20 rear**
Weight:	**9 kg**
Dimensions (WxHxD):	**429 mm x 382 mm x 85 mm**

6.2 Specification DuraMON 24” G-Line

Resolution:	1920 x 1080
Active Area	521,28 mm x 293,22 mm (23.6” diagonal)
Pixel Pitch:	0,2715 mm x 0x2715 mm
View angle:	89° (L/R/T/B) (typical)
Viewing distance:	934 mm minimum
Luminance:	250 cd/m² (typical)
Contrast ratio:	3000:1 (typical)
Colors:	16.7 mill. (24-bit)
Response Time:	25 ms (GtG) (typical)
Window:	Anti-Reflective coated front G-Line
Protection:	IP65 front – IP20 rear
Weight:	10 kg
Dimensions (WxHxD):	593 mm x 384,1 mm x 78 mm

6.3 Specification DuraMON 26” G-Line

Resolution:	1920 x 1200
Active Area	550.08mm x 343.8mm (25.54” diagonal)
Pixel Pitch:	0,2865 mm x 0,2865 mm
View angle:	88° (L/R/T/B) (typical)
Viewing distance:	985 mm minimum
Luminance:	350 cd/m² (typical)
Contrast ratio:	1500:1 (typical)
Colors:	16.7 mill. (24-bit)
Response Time:	20 ms (GtG) (typical)
Window:	Anti-Reflective coated front G-Line
Protection:	IP65 front – IP20 rear
Weight:	16 kg
Dimensions (WxHxD):	621 mm x 435 mm x 89 mm

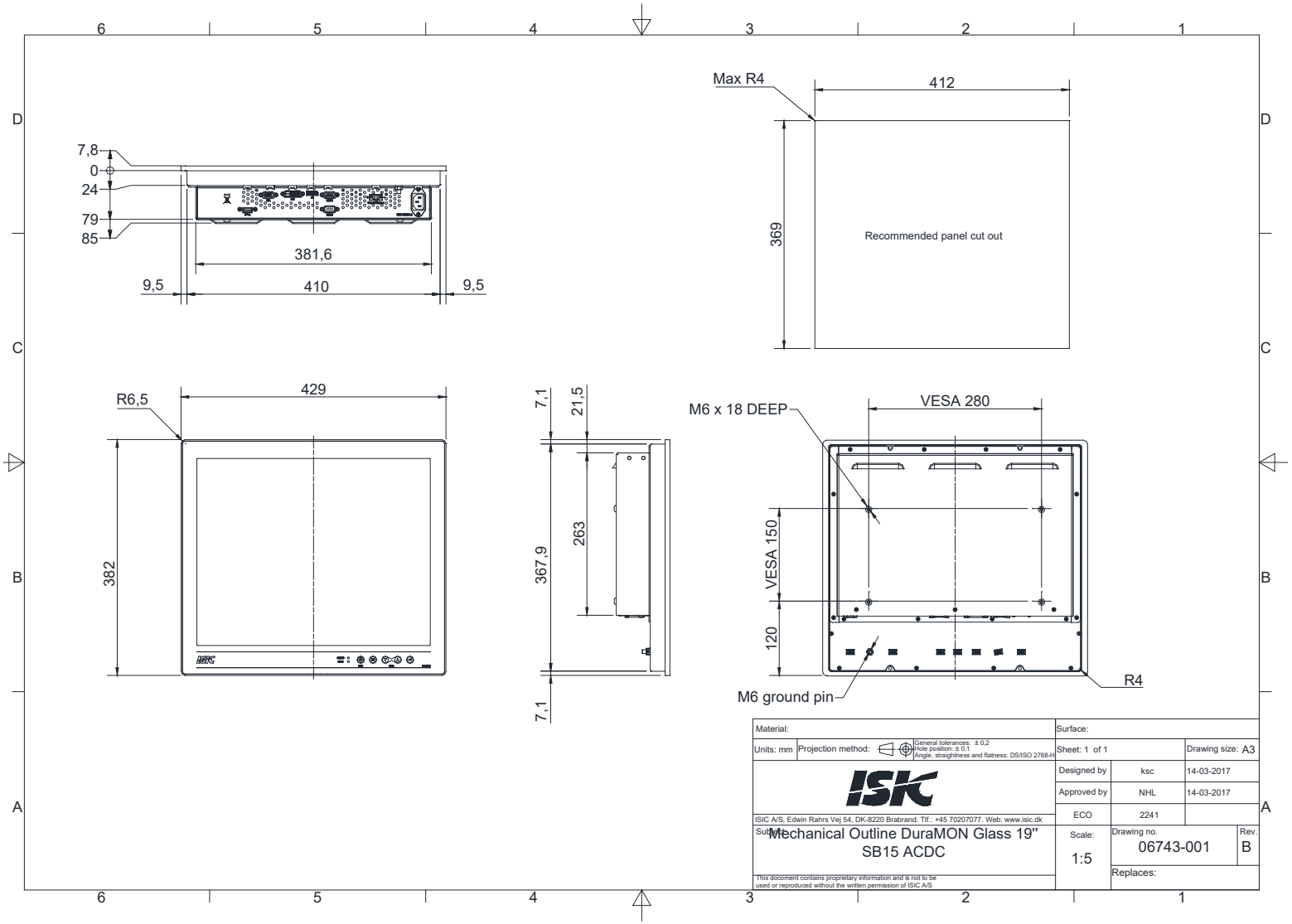
6.4 Specification DuraMON 27” G-Line

Resolution:	1920 x 1080
Active Area	597.89mm x 336.31mm (27” diagonal)
Pixel Pitch:	0,3114 mm x 0,3114 mm
View angle:	89° (L/R/T/B) (typical)
Viewing distance:	1070 mm minimum
Luminance:	350 cd/m² (typical)
Contrast ratio:	3000:1 (typical)
Colors:	16.7 mill. (24-bit)
Response Time:	14 ms (GtG) (typical)
Window:	Anti-Reflective coated front G-Line
Protection:	IP65 front – IP20 rear
Weight:	15 kg
Dimensions (WxHxD):	679 mm x 432,1 mm x 70 mm

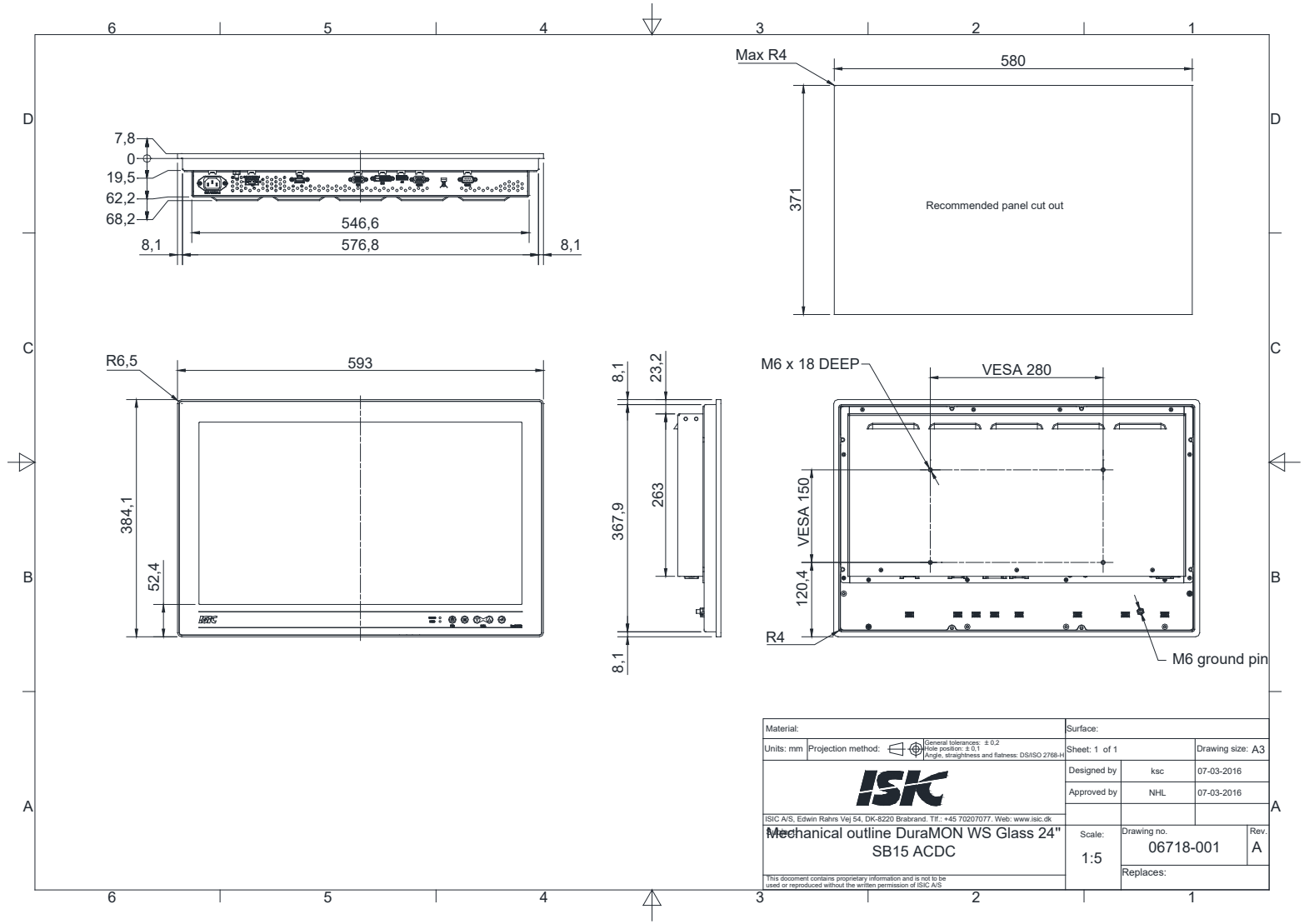
6.5 Specification DuraMON 32” G-Line

Resolution:	**1920 x 1080**
Active Area	**698.4mm x 392.85mm (31,5” diagonal)**
Pixel Pitch:	**0,3637 mm x 0, 3637 mm**
View angle:	**89° (L/R/T/B) (typical)**
Viewing distance:	**1,30 m**
Luminance:	**450 cd/m² (typical)**
Contrast ratio:	**3000:1 (typical)**
Colors:	**16.7 mill. (24-bit)**
Response Time:	**8 ms (GtG) (typical)**
Window:	**Anti-Reflective coated front G-Line**
Protection:	**IP65 front – IP20 rear**
Weight:	**18 kg**
Dimensions (WxHxD):	**762 mm x 476 mm x 77,7 mm**

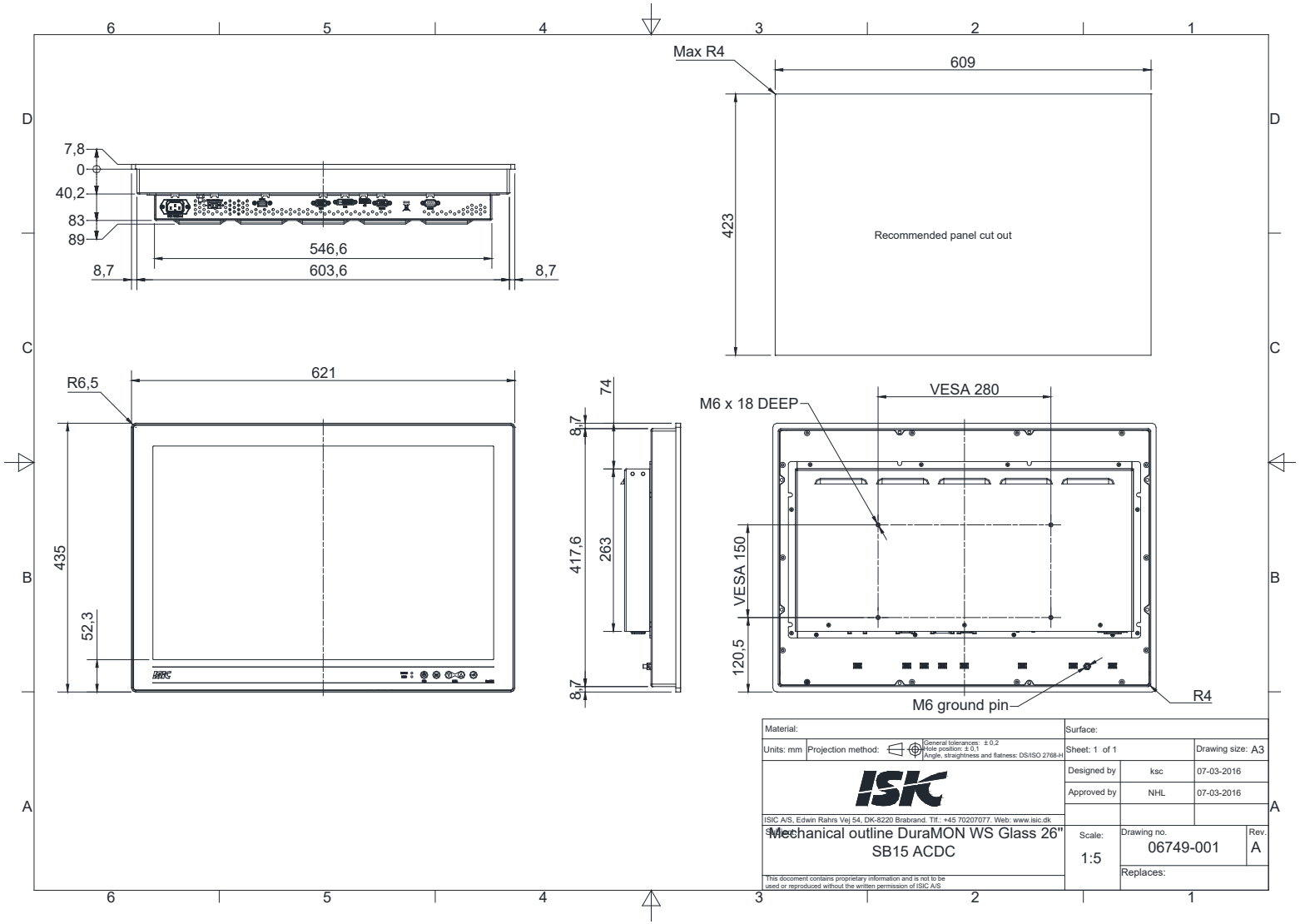
6.6 Mechanical outline DuraMON 19” G-Line



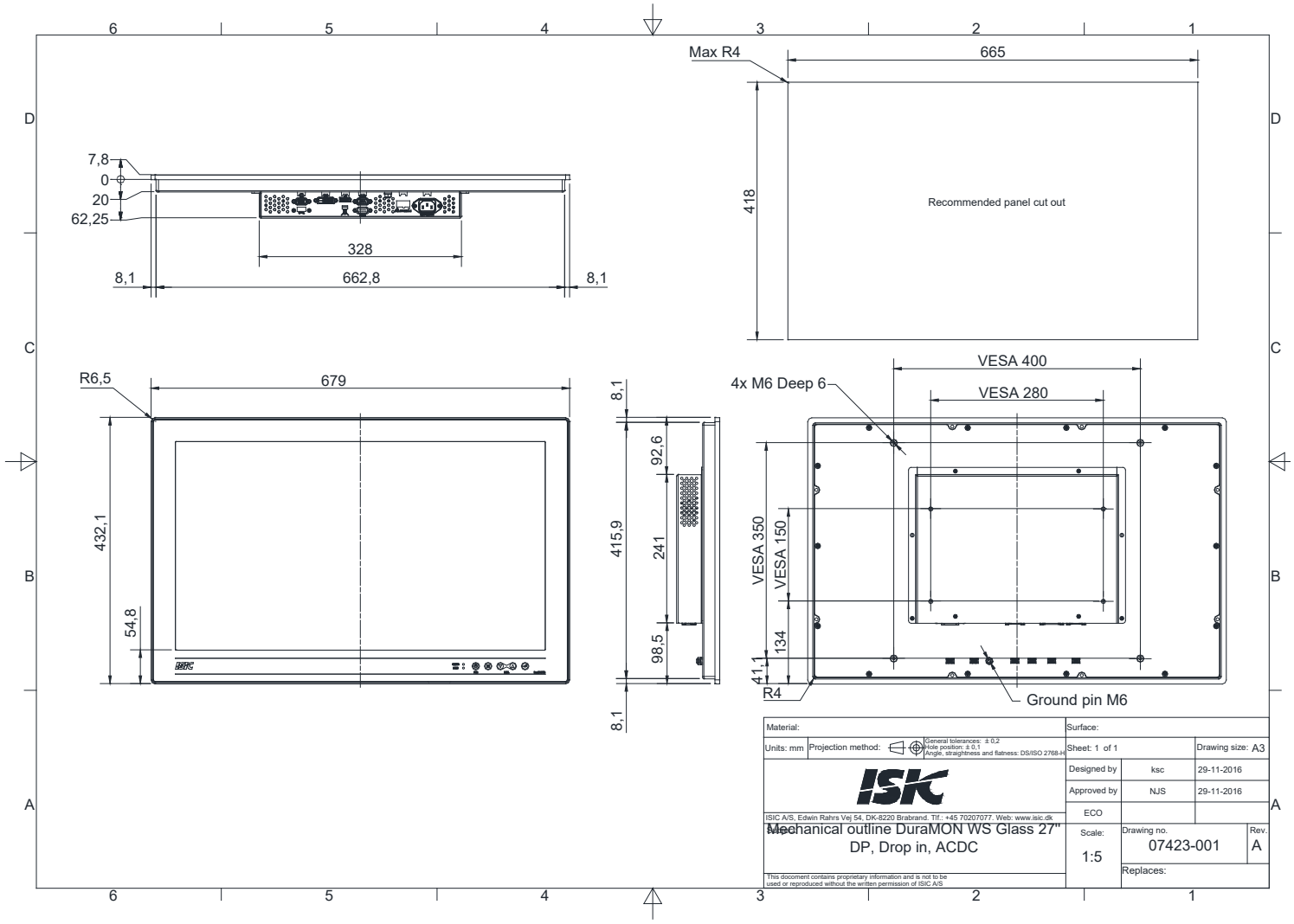
6.7 Mechanical outline DuraMON 24” G-Line



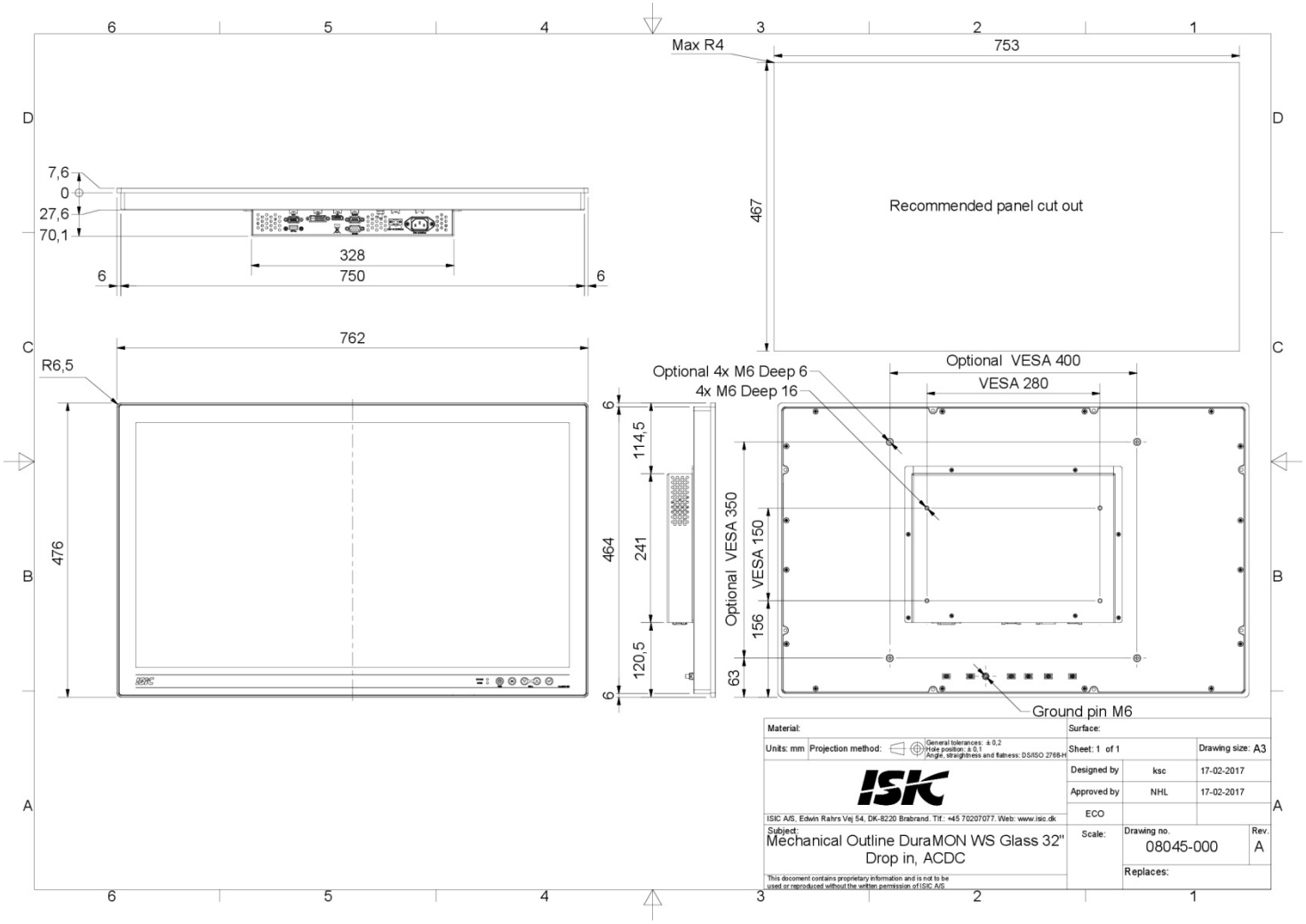
6.8 Mechanical outline DuraMON 26” G-Line



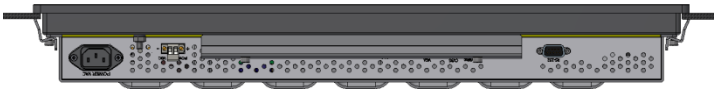
6.9 Mechanical outline DuraMON 27” G-Line



6.10 Mechanical outline DuraMON 32” G-Line



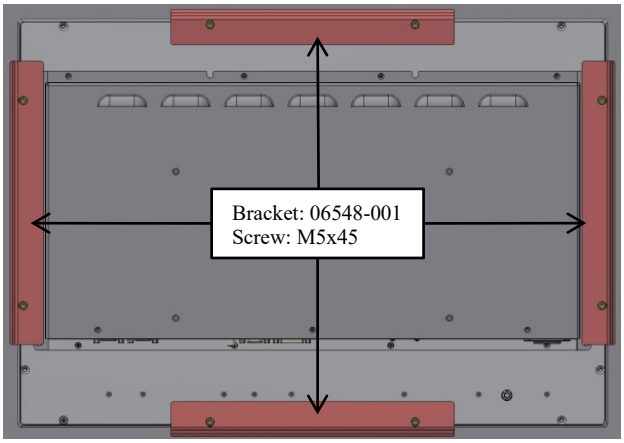
7 Mounting of DuraMON G-Line in console



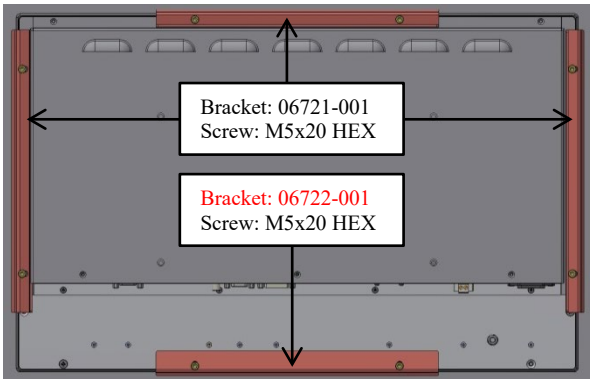
1) Place the monitor in the cut out and mount the brackets as illustrated with the screws that comes with the monitor.
   Thickness of mounting plate 2mm – 12mm.)

2) Tighten screws to lock brackets (3 Nm).

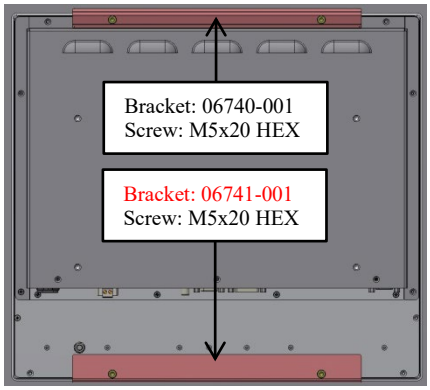
DuraMON 26” G-Line Monitor



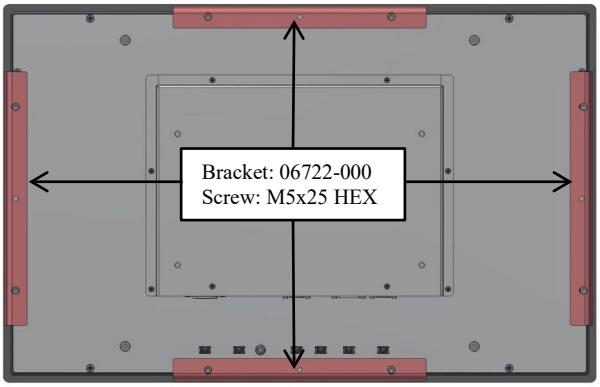
DuraMON 24” G-Line Monitor

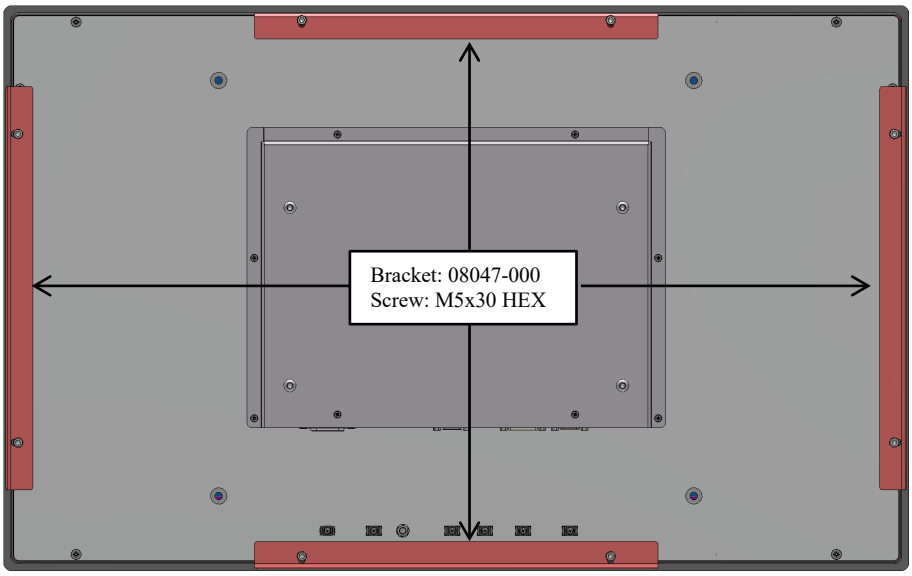


DuraMON 19” G-Line Monitor



DuraMON 27” G-Line Monitor





Notice:
Always use original screws or similar type. To avoid breaking the front G-Line, never tighten screws unless mounted with bracket.

8 ECDIS mode

Be aware that use of the backlight, brightness or contrast controls in ECDIS mode may inhibit visibility of information particularly at night!

To setup ECDIS on the system a color map must be downloaded from the monitor to the ECDIS application. Please see the Dura Serial Communication protocol for details.

9 Dura Serial Communication protocol

See document 04924-001 for protocol details.

The type of the product can be queried by sending the 'TYP' command, ref. the Serial Protocol Document

Monitor	Response from monitor
DuraMON 19" G-Line	DuraMON G-Line 19
DuraMON 24" G-Line	DuraMON G-Line 24
DuraMON 26" G-Line	DuraMON G-Line 26
DuraMON 27" G-Line	DuraMON G-Line 27
DuraMON 32" G-Line	DuraMON G-Line 32

10 Buzzer

Controlled by serial command, See document 04924-001 for protocol details.

11 Touch driver

If the monitor is equipped with a PCAP touch sensor the controller is HID Multi-touch compatible.
Microsoft Windows 7, 8 &10 has the driver as part of the operating system.
Some Linux systems come with the HID driver as part of the Linux kernel.

12 Compass safe distance

Test object / condition	Minimum Compass safe distance [cm] (5.4°/H deviation or a horizontal magnetic flux of 0.094µT)	Minimum Compass safe distance [cm] (18°/H deviation or a horizontal magnetic flux of 0.313µT)
DuraMON 19" G-Line	165	105
DuraMON 24" G-Line	245	140
DuraMON 26" G-Line	190	115
DuraMON 27" G-Line	220	135
DuraMON 32" G-Line	265	145

13 Power Consumption

Test object / condition	Ptyp [W]	Pmax [W]
DuraMON 19" G-Line	35	45
DuraMON 24" G-Line	25	35
DuraMON 26" G-Line	50	60
DuraMON 27" G-Line	30	35
DuraMON 32" G-Line	50	60

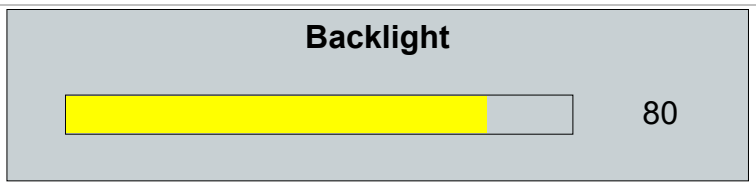
14 Inrush current

Test object / condition	24 [VDC]	115 [VAC]	230 [VAC]
DuraMON 19" G-Line	105	55	100
DuraMON 24" G-Line	105	55	100
DuraMON 26" G-Line	105	60	110
DuraMON 27" G-Line	105	55	100
DuraMON 32" G-Line	105	60	110

15 OSD Menu

15.1 Popup Menu

Without entering the OSD menu it is possible to adjust brightness by pressing “up” or “down” key.

Press “up” or “down”		It is now possible to adjust the backlight level by pressing either up- or down key.

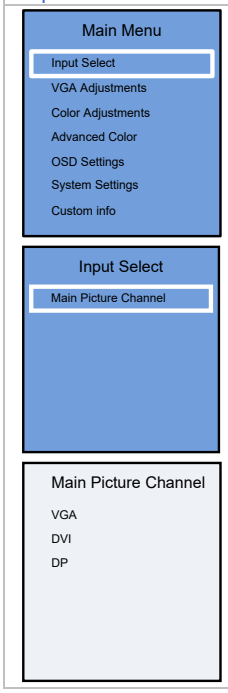
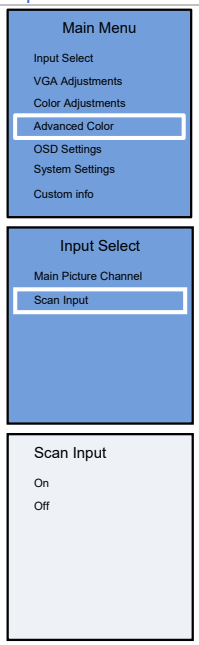
15.2 Advanced OSD

With the Advanced OSD (On Screen Display) you can modify the settings and control the special features of the DuraMON as described on the next pages.

To enter the Advanced OSD, press both the “ENTER” and the “MENU” button at the same time.

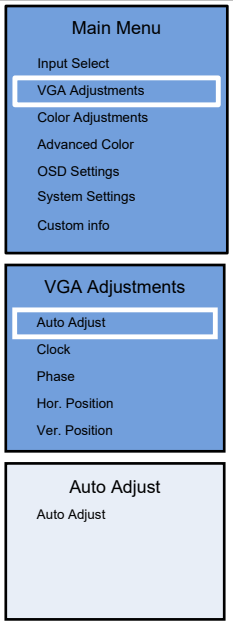
To navigate the Advanced OSD use the “UP” and “DOWN” buttons and press “ENTER” to select a specific setting. To get back to the previous menu point, press the “MENU” button.

15.3 Input select

Input Select – Main Picture Channel		Input Select – Scan Input	
	The Main Picture Channel can be selected between all available inputs (VGA, Display Port and DVI.		Scans Inputs for active source. Default is On.

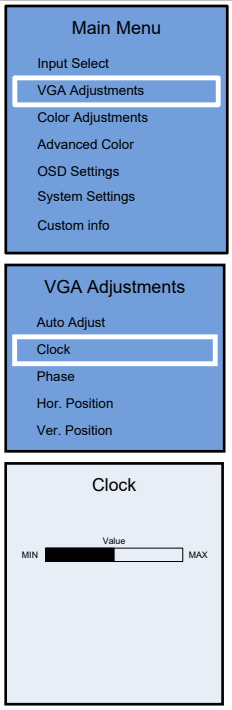
15.4 VGA Adjustments

Image Adjustments – Auto Adjust



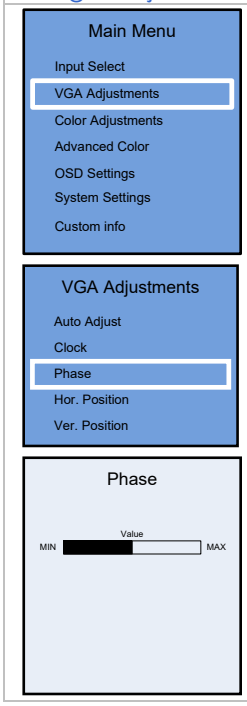
Selecting auto adjust will force the system to adjust the image (clock, phase, bandwith and position)

Image Adjustments – Clock



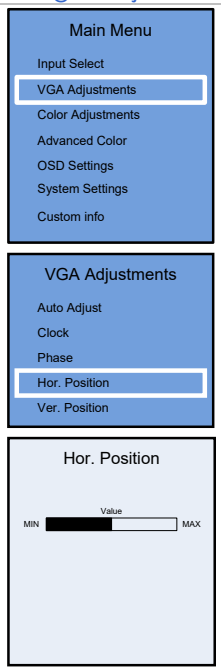
The pixel clock for VGA can be selected here.

Image Adjustments – Phase



The phase of the display can be set for VGA.

Image Adjustments – Hor. Position



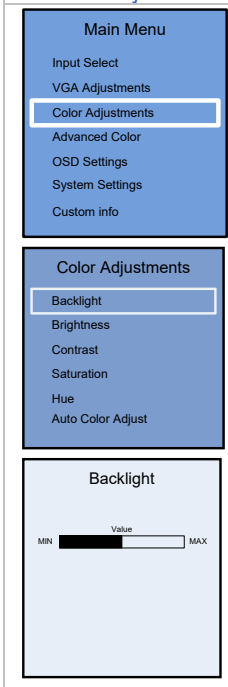
The horizontal position of the picture can be set here.

Image Adjustments – Vert. Position

The vertical position of the picture can be set here.

15.5 Color adjustments (not available in ECDIS mode)

Color Adjustment – Backlight

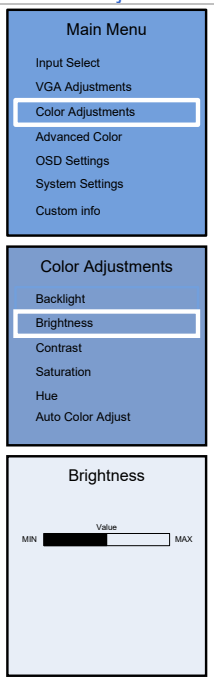


It is possible to set the backlight level.

Default is 50%.

Unless popups or OSD is present it is possible to press the "UP" or "DOWN" button to adjust the backlight level and then press "ENTER" afterwards.

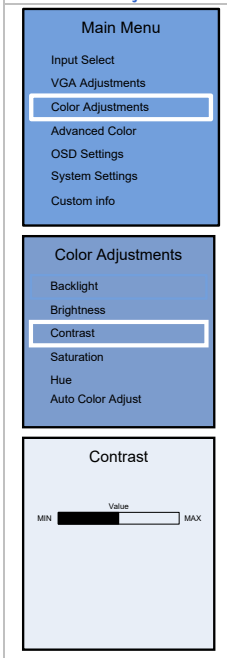
Color Adjustment – Brightness



It is possible to set the brightness level.

Default is 50%.

Color Adjustment – Contrast



It is possible to set the Contrast level.

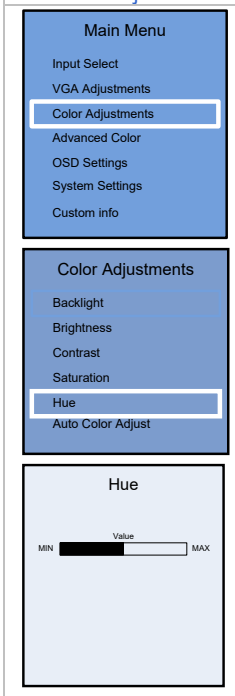
Default is 50%.

Color Adjustment – Saturation

It is possible to set the color saturation level.

Default is 50%.

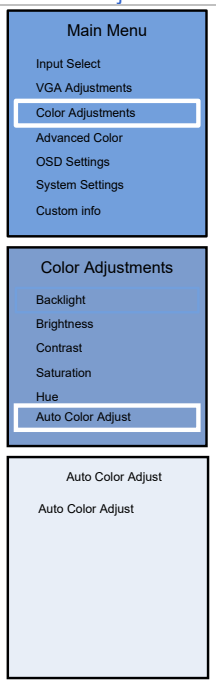
Color Adjustment – Hue



It is possible to set the Hue level.

Default is 50%.

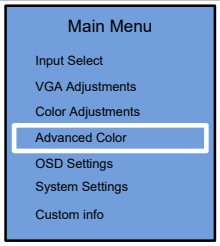
Color Adjustment – Auto Color Adjust

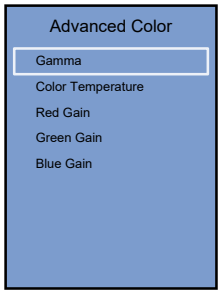


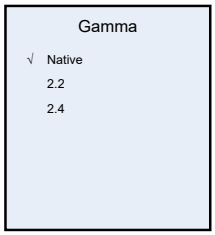
It is possible to set use the command Auto Color Adjust.

15.6 Advanced Color (not available in ECDIS mode)

Adv. Color Settings – Gamma



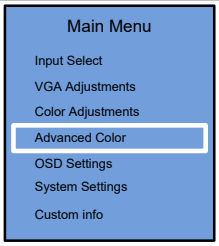


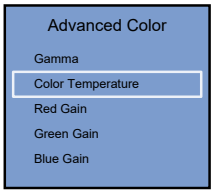


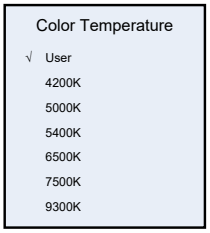
It is possible to set the Gamma

Default is Native.

Adv. Color Settings – Color Temp



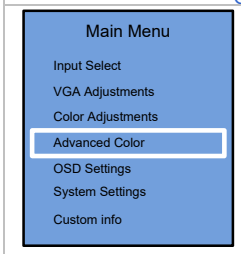


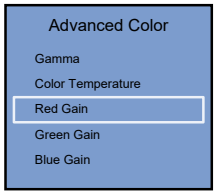


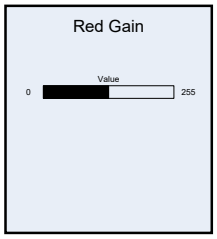
It is possible to set the Color Temperature.

Default is User.

Adv. Color Settings – Red/Green/Blue







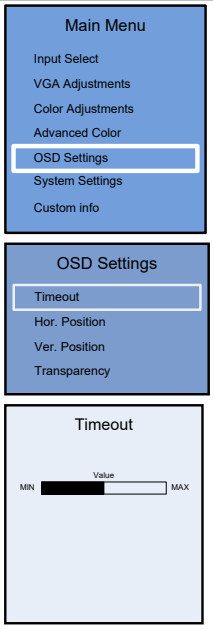
The rate for Red/Green/Blue can be set here from 0 – 255.

Default is 255/255/255

Note: These values are only adjustable when Color Temperature is set to 'User'

15.7 OSD settings

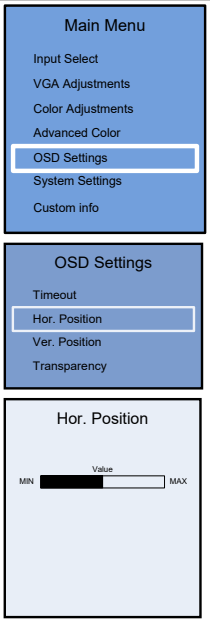
OSD Settings – Menu Timeout



The Menu Timeout period can be set between 0 and 60 seconds in steps of 5 seconds.

Default is 30 seconds

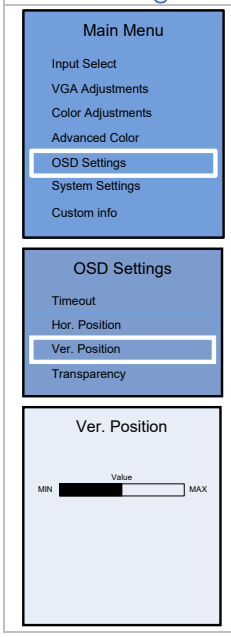
OSD Settings – Menu Hor. Pos.



The Horizontal Position of the OSD can be set from 0 (left margin) to 100 (right margin).

Default is 0 (left margin).

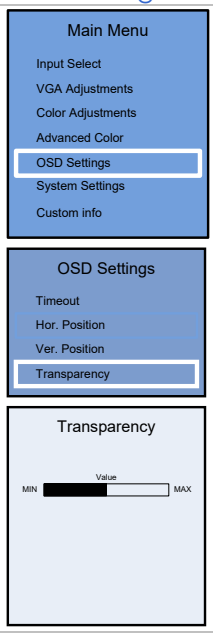
OSD Settings – Menu Vert. Pos.



The Vertical Position of the OSD can be set from 0 (upper margin) to 100 (bottom margin).

Default is 50 (center of the display)

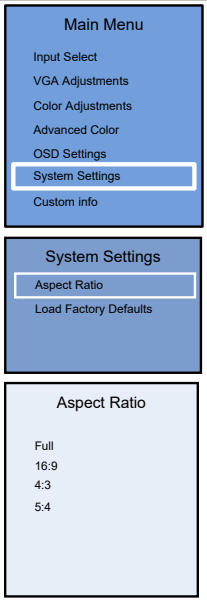
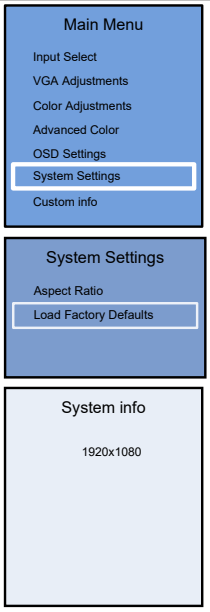
OSD Settings – Transparency



The transparency of both the OSD and the Popup can be selected from 0 (solid) to 15 (clear)

Default is 2

15.8 System settings

System Settings – Aspect Ratio		System Settings – Load Factory Defaults	
	Change Aspect Ratio. Default is Full.		Reset the monitor to factory settings.

16 Troubleshooting

Problem	Cause	Solutions
No picture on display	Backlight level set to minimum	Increase backlight
No picture on display	Monitor turned off	Turn on the monitor
No picture on display	No input signal present	Apply signal
No picture on display	No power cord connected	Apply power
Buttons on front doesn't work	Unit in ECDIS mode	Press Menu + Enter to unlock the monitor
Buttons on front doesn't work	Keypad defect	Please do not try to open the unit. Send it to ISIC A/S for repair.
The unit will not turn on.	Unknown	Please do not try to open the unit. Send it to ISIC A/S for repair.

17 Servicing the unit

In case that the unit still fails after following the troubleshooting send the unit to ISIC for repair. There are no user serviceable parts inside and to ensure ECDIS compliance the monitor has to be recalibrated at ISIC.

18 Terms, Acronyms and abbreviations

Communication protocol:	Use a serial link to control various settings in the monitor
DVI-D:	Digital Visual Interface
ECDIS:	Electronic Chart Display and Information System
GtG:	Grey to Grey
IP20:	International Protection Rating (protected against objects with a size larger than 12.5mm)
IP65:	International Protection Rating (dust tight and protected against water jets)
OSD:	On Screen Display
VGA:	Video Graphics Array
DP:	Display Port

19 ISIC info / Support

In case you have inquiries or problems with your DuraMON G-Line, you have a number of possibilities to get support.

Company name:	ISIC A/S
Head office:	Edwin Rahrs Vej 54 DK – 8220 Brabrand Denmark
Shipping address:	Holmstrupgaardvej 5 DK-8220 Brabrand Denmark
Telephone:	+45 70 20 70 77
Mail: www:	isic@isic-systems.com www.isic-systems.com
VAT number:	DK 16 70 45 39
Bank Address:	Danske Bank A/S Holmens Kanal 2-12 DK-1092 København K Denmark
Bank Code: IBAN DKK: IBAN EUR: IBAN USD: SWIFT:	3000 DK51 3000 0013 6133 11 DK30 3000 4073 0448 71 DK77 3000 4073 0448 98 DABADKKK
Contacts: RFQ's:	By mail to sales@isic-systems.com
Orders:	By mail to orders@isic-systems.com
Support:	Via homepage www.isic-systems.com under aftersales By mail to service@isic-systems.com During office-hours (Mo-Fr: CET 0800 - 1600) at +45 70 20 70 77
Service:	Before shipment for service Request Return Material Authorization number at homepage http://www.isic-systems.com/aftersales/tech-support-rma/ By mail to service@isic-systems.com

20 Revision history

Rev A	June 2016	First release
Rev B	November 18, 2016	**Page 1**, added DuraMON 27 G-Line **Page 8**, added I/O drawing **Page 9**, section 6.1, added: Scan Inputs; **Page 14,** added: Change Aspect Ratio. **Page 15,** corrected vert position and transparency in bottom menu. **Page 16,** section 8, Input voltage changed to 18-31VDC, added: Buzzer **Page 19**, view distance for 27" changed to 1.08m **Page 22**, section 15, added: Buzzer; **Page 23**, added outline drawing **Page 23**, DuraMON 19 G-LINE, changed: max power 45W **Page 25**, added 27" to Serial protocol and compass distance **Page 26**, added power consumption and inrush current for 27"
Rev C	December 22, 2016	**Page 19,** updated weight for 27" **Page 24,** added 27 mounting illustration **Page 25**, added compass safe distance for 27"
Rev D	May 16, 2017	**Page 1**, added DuraMON 32 **Page 6**, added 32" to warm up table **Page 8**, added 32" I/O drawing **Page 11**, Changed 422 & 485 to optional and male connector **Page 12**, changed DC voltage to 18-31VDC **Page 13,** changed 27" brightness to 300 cd **Page 15**, updated 19" outline, logo ISIC **Page 18**, updated 27" outline, logo ISIC **Page 19**, changed video input information **Page 21**, added 32" specification **Page 26**, added 32" mechanical dimensions **Page 28**, added outline for rear part of 32" monitor **Page 29**, added 32" compass safe distance and response from serial protocol **Page 30**, added power consumption and inrush current for 32" Moved section OSD to end of manual
Rev E	January, 2018	**Page 8,** changed RS422 to RS232 and added RS485 **Page 12,** added Type Approvals **Page 13**, changed viewing distance to 1.00m **Page 14**, changed viewing distance to 1.30m **Page 23,** corrected Compass safe values for DuraMON 32
Rev F	Marts, 2018	**Page 9,** Changed color of ECDIS LED
Rev E	September, 2025	General update

21 Appendix A: Pixel policy

ISO 9241-307:2008 guidelines for LCD pixel defects

Introduction

TFT displays consist of a set number of pixels. Each pixel consists of 3 sub-pixels also called dots (one red, one blue and one green). Every sub-pixel is addressed by its own transistor. As a result, the manufacturing of G-Line substrate is very complex.
Due to the nature of this manufacturing process, occasional defects can occur. Pixel defects or failures cannot be fixed or repaired and may occur at any stage during the service life of the TFT display.
To regulate the acceptability of defects and protect the end user, ISIC A/S complies with the ISO 9241-307:2008 standard. This standard recommends how many defects are considered acceptable in a display, before it should be replaced within the terms of the warranty.

Monitor classification

ISO 9241-307:2008

Allowed defects per type per million pixels						
Defect classes	**Pixel defects**			**Cluster defect**		
	Type 1	**Type 2**	**Type 3 total** ($2xN_{3a} + N_{3b}$)	**Type 1**	**Type 2**	**Type 3**
Class: 0	0	0	0	0	0	0
Class: I	1	1	5	0	0	0
Class: II	2	2	10	0	0	1
Class: III	5	15	100	0	0	5

ISIC TFT monitors comply with ISO 9241-307:2008 Class II.
Special agreements about other classifications can be made between ISIC A/S and the customer.

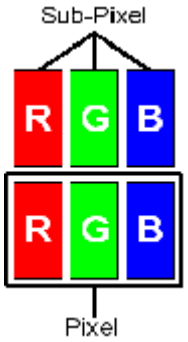
Measurement method/monitoring conditions for pixel defects

In compliance with the ISO-9241-307:2008 standard, the following conditions are observed:

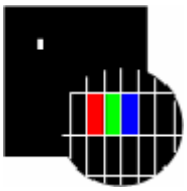
- Final check for pixel fault undertaken right after burn-in, i.e. with pre-heating of the display.
- Surrounding temperature 25ºC ± 5ºC
- Relative air humidity 40–70%

Pixel definition

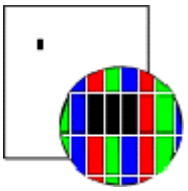
Every pixel consists of three sub-pixels/dots (red, blue, green).
Every sub-pixel has its own transistor.
The three sub-pixels/dots must be considered as one unit.



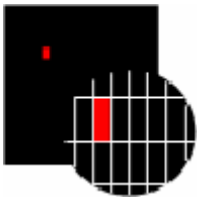
Pixel



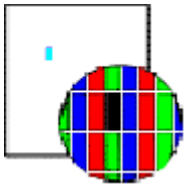
Pixel defect type 1 Pixel constantly lit



Pixel defect type 2 Pixel constantly dark



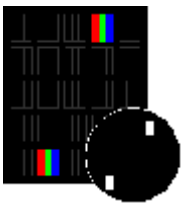
Pixel defect type 3a
Sub-pixel/dot (red, blue, green) constantly lit



Pixel defect type 3b
Sub-pixel/dot (red, blue, green) constantly dark

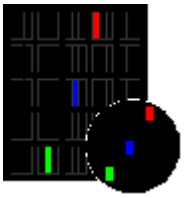
Cluster

A cluster consists of 5 x 5 pixels.



Cluster pixel defect type 1
Pixels in a cluster area constantly lit

Cluster pixel defect type 2
Pixels in a cluster area constantly dark



Cluster pixel defect type 3a
Sub-pixels/dots in a cluster area constantly lit

Cluster pixel defect type 3b
Sub-pixels/dots in a cluster area constantly dark

Pixel faults accepted by ISIC A/S

The maximum number of pixel faults that is considered acceptable at different screen resolutions is shown in the table below.

This is the native resolution and not the resolution as adjusted by user.

Class II

Allowable number of pixel faults in monitor applications							
Screen type	**Native resolution**	**Number of pixels**	**Pixel defect type 1**	**Pixel defect type 2**	**Pixel defect Type 3 total** ($2xN_{3a} + N_{3b}$)	**Cluster defect type 1 and 2**	**Cluster defect type 3**
WVGA	**800x480**	**384,000**	**0**	**0**	**3**	**0**	**0**
XGA	**1024x768**	**768,432**	**1**	**1**	**7**	**0**	**0**
WXGA	**1280x800**	**1,024,000**	**2**	**2**	**10**	**0**	**1**
SXGA	**1280x1024**	**1,310,720**	**2**	**2**	**13**	**0**	**1**
UXGA	**1600x1200**	**1,920,000**	**3**	**3**	**19**	**0**	**1**
FHD	**1920x1080**	**2,073,600**	**4**	**4**	**20**	**0**	**2**
WUXGA	**1920x1200**	**2,304,000**	**4**	**4**	**23**	**0**	**2**

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