DuraMON

DuraMON15
DuraMON19
DuraMON22
DuraMON24
DuraMON26
DuraMON27

User Reference Manual

ISIC

Disclaimer

ISIC A/S makes no representation or warranties with respect to the contents or use of this manual, and specifically disclaims any express or implied warranties of merchantability or fitness for any particular purpose. Further, ISIC A/S reserves the right to revise this publication and to make changes to its content at any time, without obligation to notify any person or entity of such revisions or changes.
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 ed.4 (former class b).

Approvals

Approval according to IACS E10 ed. 6 and IEC 60945 ed. 4, Maritime navigation and radio communication equipment and systems – General requirements.
ECDIS IEC 61174 ed. 4 (Not available on 15" & 22")
Radar IEC 62288 ed. 2
Radar IEC 62388 ed. 2

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.

Copyright 2016 ISIC A/S
ISIC PN: 05192-075

ISIC A/S
Edwin Rahrs Vej 54
DK-8220 Brabrand
Denmark

Phone: +45 70 20 70 77
Fax: +45 70 20 79 76
Web: http://www.isic-systems.com

Table of Contents

1 Features

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

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

The DuraMON 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 (0-100%) from UP/DOWN buttons (except ECDIS models).
Full settings control via menu or serial link.
Support for DDC
Anti-Reflective coated glass.
IP65 protected front.

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

Resistant to most chemicals

Optional Touch Screen available, but has to be ordered with the monitor (not part of the IEC 60945 approval).

2 General considerations on Installation and Operation

The DuraMON 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

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, 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 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

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.

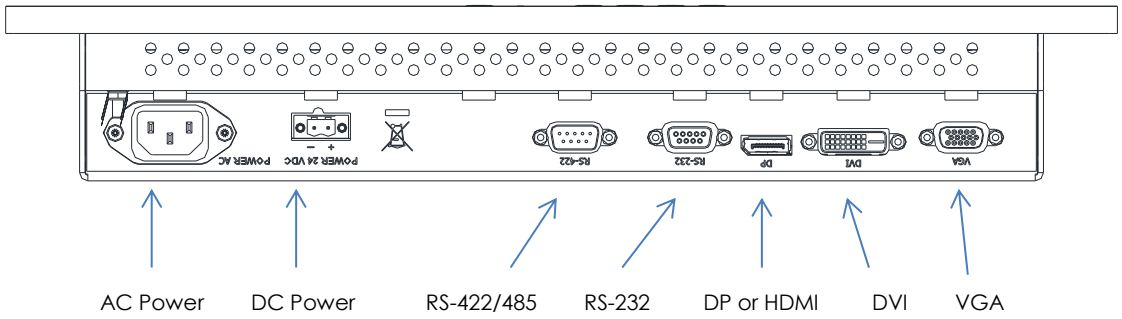
The warm-up period is as follows:

	Day mode	Dusk mode	Night mode
DuraMON19	30 min	30 min	30 min
DuraMON24	30 min	30 min	30 min
DuraMON26	30 min	30 min	30 min
DuraMON27	30 min	30 min	30 min

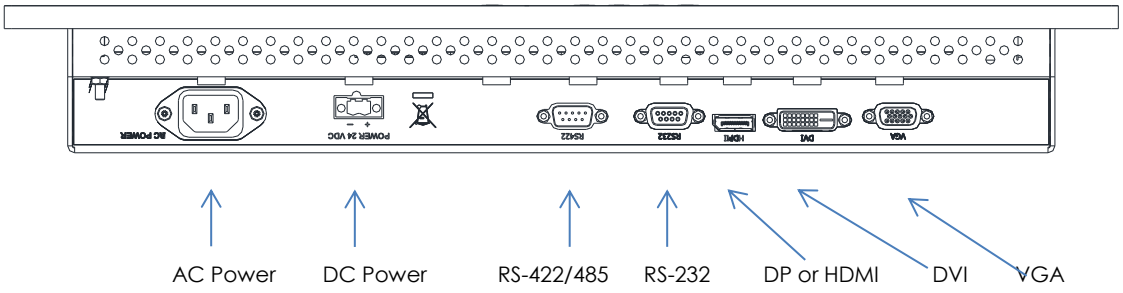
3 DuraMON connections

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

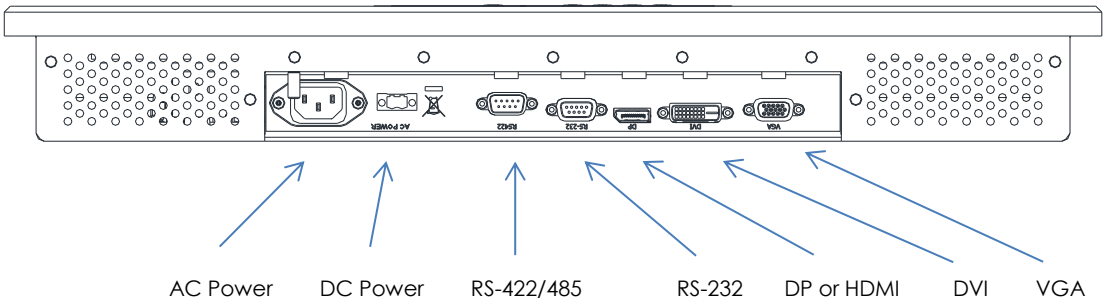
15":



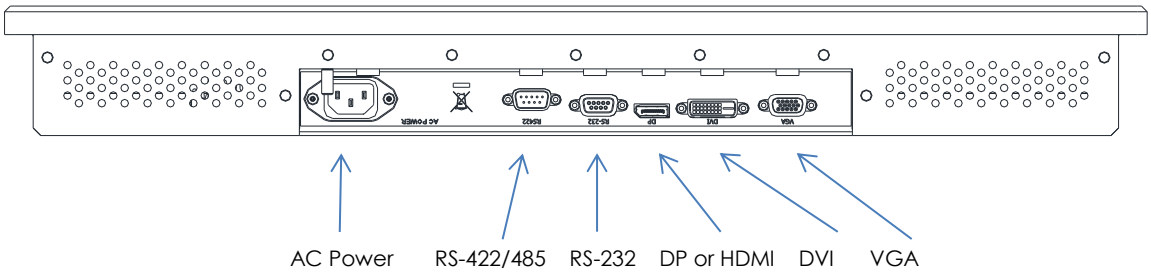
19":



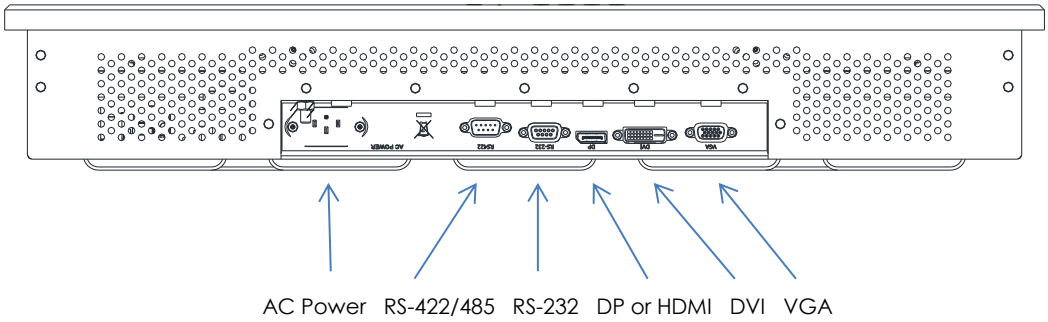
22":



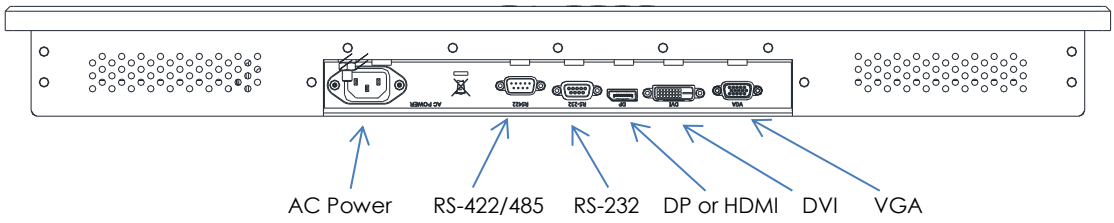
24":



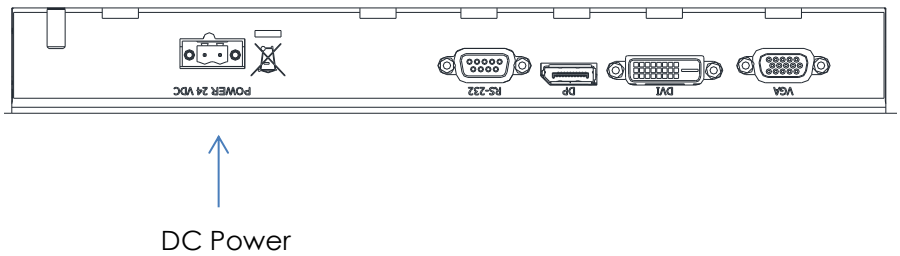
26":



27":

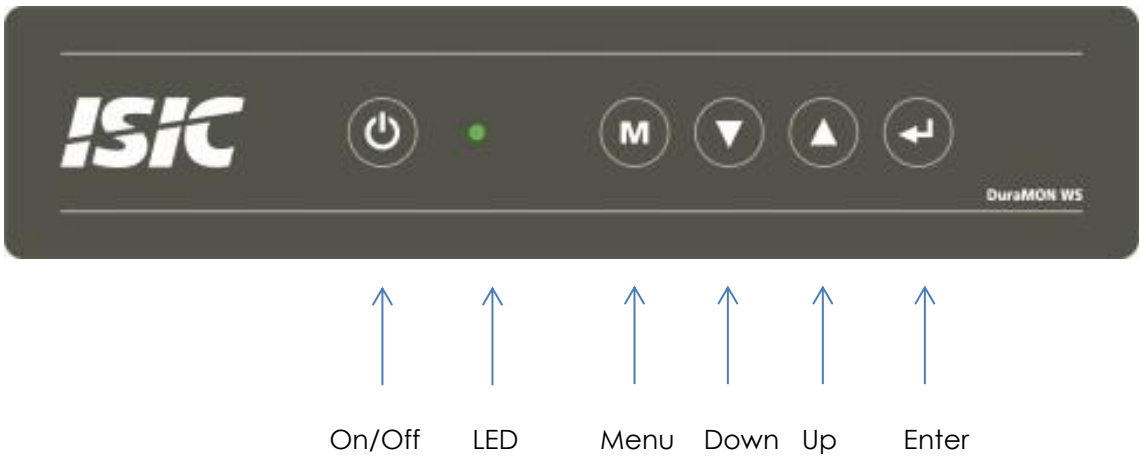


To connect the DC power connector you need a screw driver
Only use multicore cables from AWG16 to AWG12 (1.0 mm^2 to 4 mm^2)
DC connector: Weidmüller, BLZP 5.08HC/02/180F SN BK BX, 1944330000
AC Connector: IEC 60320 type C13



4 DuraMON front panel controls

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



ON/OFF:
This key is used to turn the product on or off. Pressing it will turn the power on, while holding it pressed for 5 seconds will turn the power off. The light in the button 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.

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

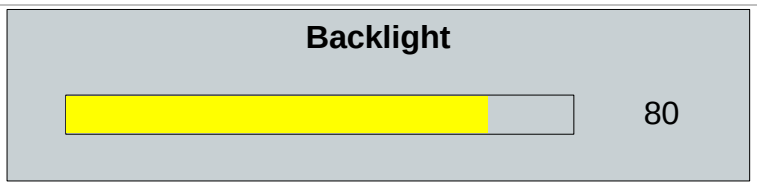
Menu:
To activate the OSD menu, press "Menu" and "Enter" buttons at the same time.
See Popup Menu section for details.

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 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.

6 Advanced OSD

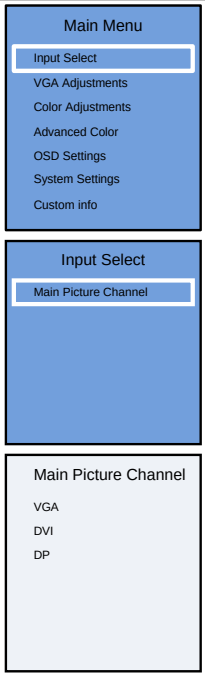
With the Advanced OSD (On Screen Display) you can modify the settings and control the special features of the DuraMON as described on the next pages.

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.

6.1 Input select

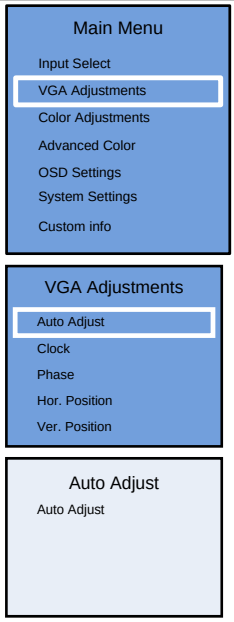
Input Select – Main Picture Channel



The Main Picture Channel can be selected between all available inputs (VGA, Display Port and DVI.

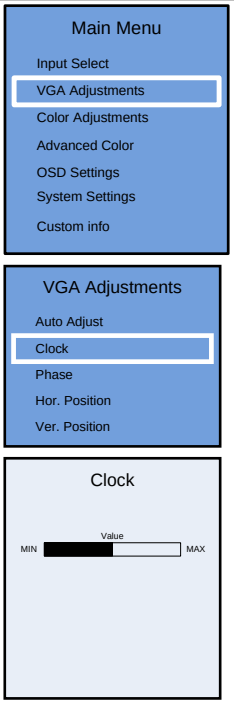
6.2 VGA Adjustments

Image Adjustments – Auto Adjust



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

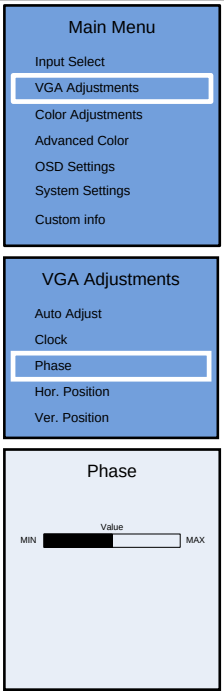
Image Adjustments – Clock



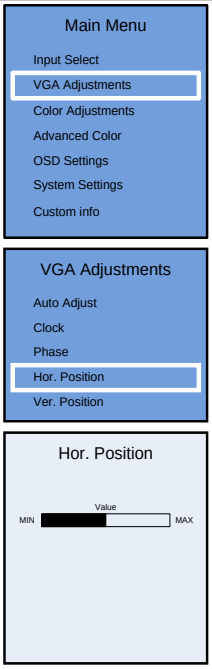
The pixel clock for VGA can be selected here.

Image Adjustments – Phase

Image Adjustments – Hor. Position

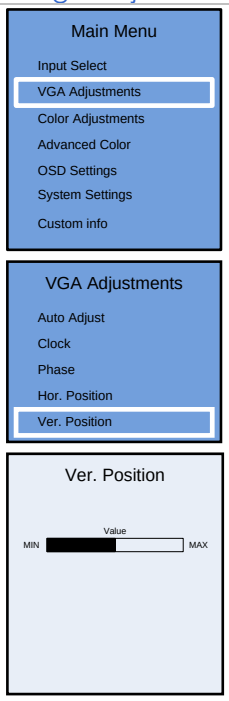


The phase of the display can be set for VGA.



The horizontal position of the picture can be set here.

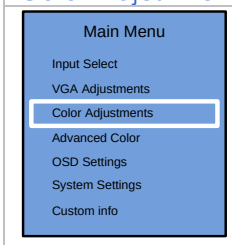
Image Adjustments – Vert. Position

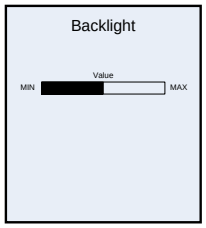


The vertical position of the picture can be set here.

6.3 Color adjustments (not available in ECDIS mode)

Color Adjustment – Backlight



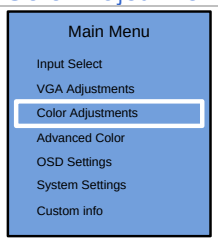


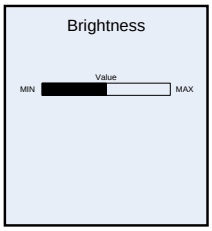
It is possible to set the backlight level.

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

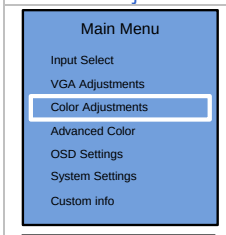


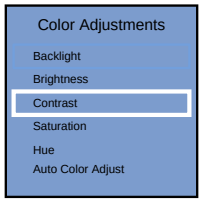


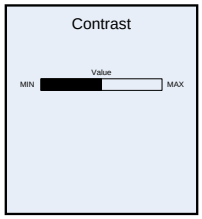
It is possible to set the brightness level.

Default is 50%.

Color Adjustment – Contrast



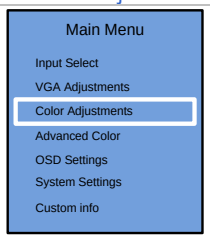


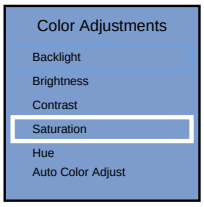


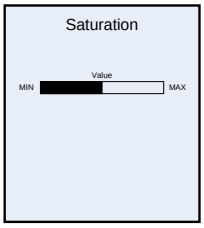
It is possible to set the Contrast level.

Default is 50%.

Color Adjustment – Saturation





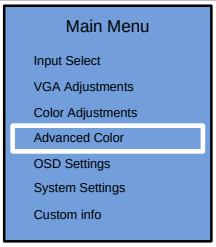


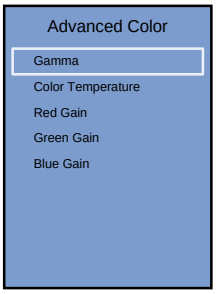
It is possible to set the color saturation level.

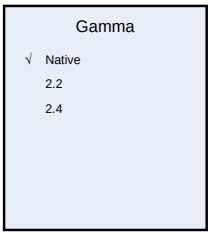
Default is 50%.

6.4 Advanced Color (not available in ECDIS mode)

Adv. Color Settings – Gamma



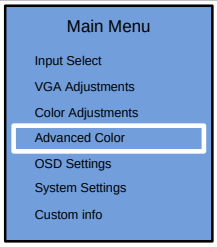


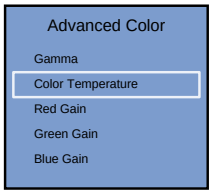


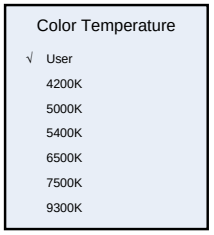
It is possible to set the Gamma

Default is Native.

Adv. Color Settings – Color Temp



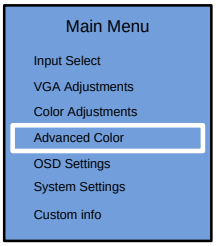


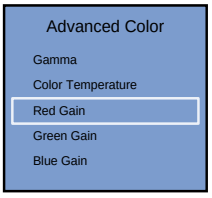


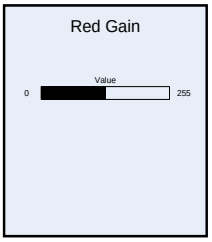
It is possible to set the Color Temperature.

Default is User.

Adv. Color Settings – Red/Green/Blue







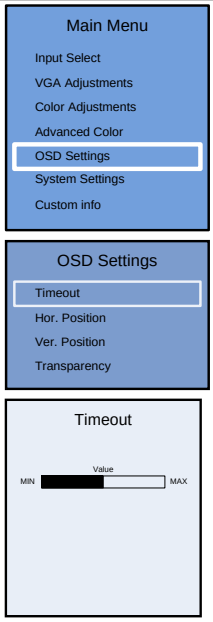
The rate for Red/Green/Blue can be set here from 0 – 255.

Default is 255/255/255

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

6.5 OSD settings

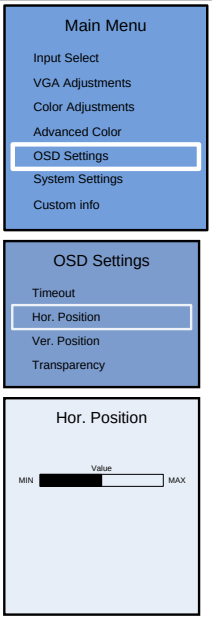
OSD Settings – Menu Timeout



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

Default is 30 seconds

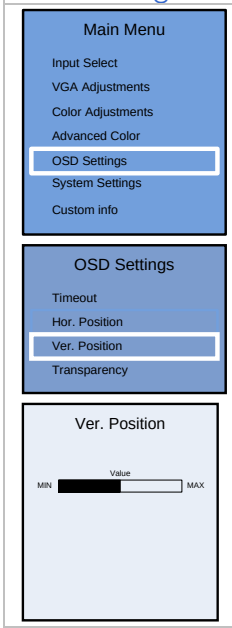
OSD Settings – Menu Hor. Pos.



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

Default is 0 (left margin).

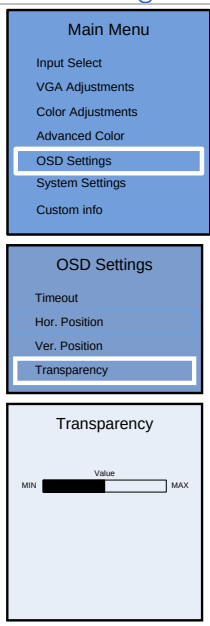
OSD Settings – Menu Vert. Pos.



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

Default is 50 (center of the display)

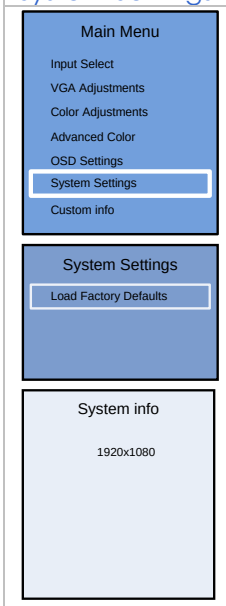
OSD Settings – Transparency



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

Default is 2

6.6 System settings

System Settings – Load Factory Defaults	
	Reset the monitor to factory settings.

7 Serial connection pin-out

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

8 Technical specifications DuraMON

DuraMON I/O

Video inputs:	**VGA :**	**Analog 0.7 Vpp. positive at 75Ω,** **Separate sync or sync on green** **Horizontal sync: 30-75KHz (automatic)** **Vertical sync: 56-75 Hz up to 1280x1024** **60 Hz up to 1920x1200**
	DVI:	**Generally all VESA compatible video modes are supported up to 165MHz (up to UXGA 60Hz and WUXGA 60Hz reduced blanking).** **Special modes supported on request.**
	Display Port 1.2 / HDMI 1.4a:	**Up to 1920x1200 (WUXGA) 60Hz reduced blanking**
Control inputs:	**1x RS-232 – for remote control.** **1x RS-422/RS-485 – for remote control / daisy-chain (optional).** **1x RS-232 – for touch (optional).**	

DuraMON Power Supply Options

Standard:	**90-264Vac. 50-60Hz Input**
Optional:	**18-36Vdc Input, (15"/19" is available with both AC and DC simultaneously)**

DuraMON Environmental Conditions

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

DuraMON Approvals

Marine:	**IEC 60945 Ed. 4, 2002-08 & IACS E10 Rev. 6 Oct. 2014**
ECDIS, Radar	**IEC 61174 ed. 4, IEC 62288 ed. 2, IEC 62388 ed. 2**

8.1 Specification DuraMON 15”

Resolution:	1024 × 768
Active Area:	304.1mm x 228.1mm (15.0” diagonal)
Pixel Pitch:	0.297mm x 0.297mm
View angle:	85° (L/R/T/B) (typical)
Luminance:	350 cd/m² (typical)
Contrast ratio:	1000:1 (typical)
Colours:	16.7 mill. (24-bit)
Response Time:	35 ms (GtG) (typical)
Window:	Anti-Reflective coated front glass
Protection:	IP65 front – IP20 rear
Weight:	4,0 Kg
Dimensions (WxHxD):	406mm x 342mm x 63.9mm

8.2 Specification DuraMON 19”

Resolution:	1280 × 1024
Active Area:	376.320mm x 301.056mm (19.0” diagonal)
Pixel Pitch:	0.294mm x 0.294mm
View angle:	89° (L/R/T/B) (typical)
Viewing distance:	1.02 m
Luminance:	300 cd/m² (typical)
Contrast ratio:	2000:1 (typical)
Colours:	16.7 mill. (24-bit)
Response Time:	20 ms (GtG) (typical)
Window:	Anti-Reflective coated front glass
Protection:	IP65 front – IP20 rear
Touch:	3M MicroTouch™ ClearTek™ II Capacitive (Optional extra)
Weight:	6,2 Kg
Dimensions (WxHxD):	483mm x 419mm x 63,9mm

8.3 Specification DuraMON 22”

Resolution:	1920 × 1080
Active Area:	476.64mm x 268.11mm (21.53” diagonal)
Pixel Pitch:	0. 2482mm x 0. 2482mm
View angle:	89° (L/R/T/B) MVA (typical) – 150/170 TN (typical)
Luminance:	300 cd/m² MVA - 250 cd/m² TN (typical)
Contrast ratio:	5000:1 MVA - 1000:1 TN (typical)
Colours:	16.7 mill. (24-bit)
Response Time:	20 ms (GtG) (typical)
Window:	Anti-Reflective coated front glass
Protection:	IP65 front – IP20 rear
Weight:	8,2 Kg
Dimensions (WxHxD):	552mm x 380mm x 68mm

8.4 Specification DuraMON 24”

Resolution:	1920 × 1080
Active Area:	521.28mm x 293,22mm (23.6” diagonal)
Pixel Pitch:	0.2715mm x 0.2715mm
View angle:	89° (L/R/T/B) (typical)
Viewing distance:	1.02 m
Luminance:	250 cd/m² (typical)
Contrast ratio:	3000:1 (typical)
Colours:	16.7 mill. (24-bit)
Response Time:	25 ms (GtG) (typical)
Window:	Anti-Reflective coated front glass
Protection:	IP65 front – IP20 rear
Weight:	9.5 Kg
Dimensions (WxHxD):	599,2mm x 408,3mm x 68mm

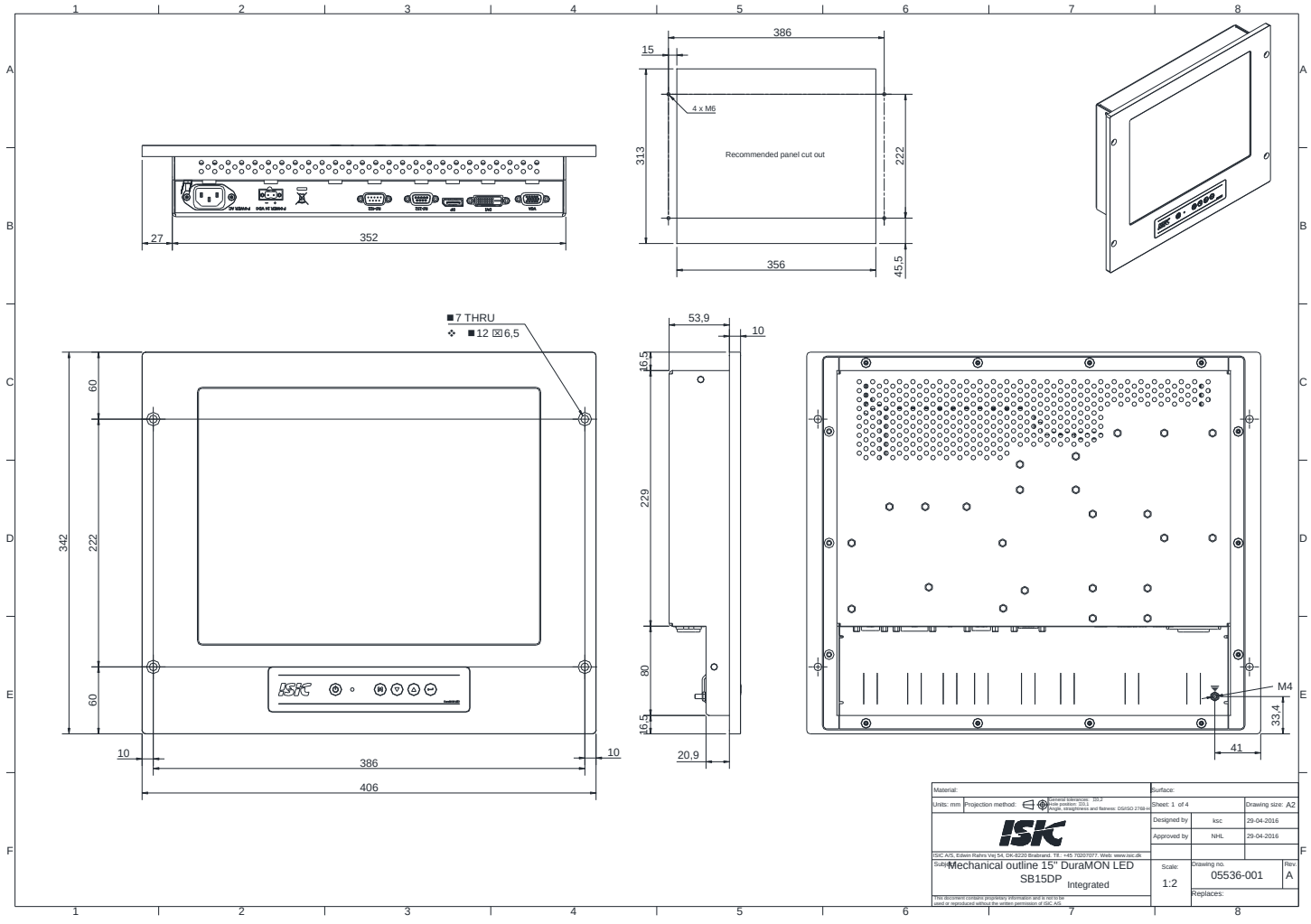
8.5 Specification DuraMON 26”

Resolution:	1920 × 1200
Active Area:	550.08mm x 343.8mm (25.54” diagonal)
Pixel Pitch:	0.2865mm x 0.2865mm
View angle:	89° (L/R/T/B) (typical)
Viewing distance:	1.02 m
Luminance:	350 cd/m² (typical)
Contrast ratio:	1500:1 (typical)
Colours:	16.7 mill. (24-bit)
Response Time:	20 ms (GtG) (typical)
Window:	Anti-Reflective coated front glass
Protection:	IP65 front – IP20 rear
Weight:	12,3 Kg
Dimensions (WxHxD):	619mm x 463mm x 98,6mm

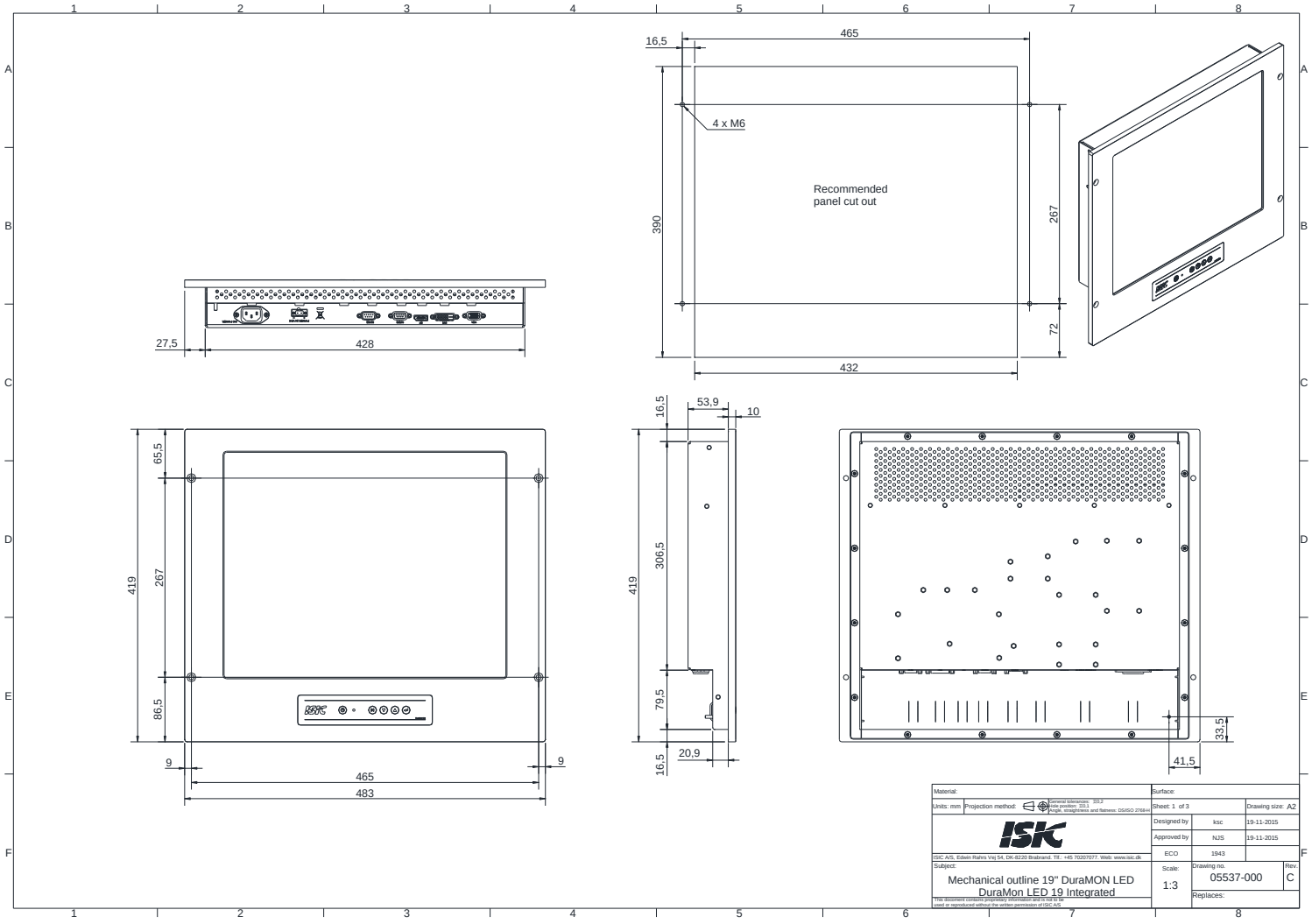
8.6 Specification DuraMON 27”

Resolution:	1920 × 1080
Active Area:	597,888 mm x 336,312 mm (27” diagonal)
Pixel Pitch:	0.3114mm x 0.3114mm
View angle:	89° (L/R/T/B) (typical)
Viewing distance:	1.08 m
Luminance:	250 cd/m² (typical)
Contrast ratio:	1000:1 (typical)
Colours:	16.7 mill. (24-bit)
Response Time:	14 ms (GtG) (typical)
Window:	Anti-Reflective coated front glass
Protection:	IP65 front – IP20 rear
Weight:	10,8 Kg
Dimensions (WxHxD):	683,5mm x 451,6mm x 68mm

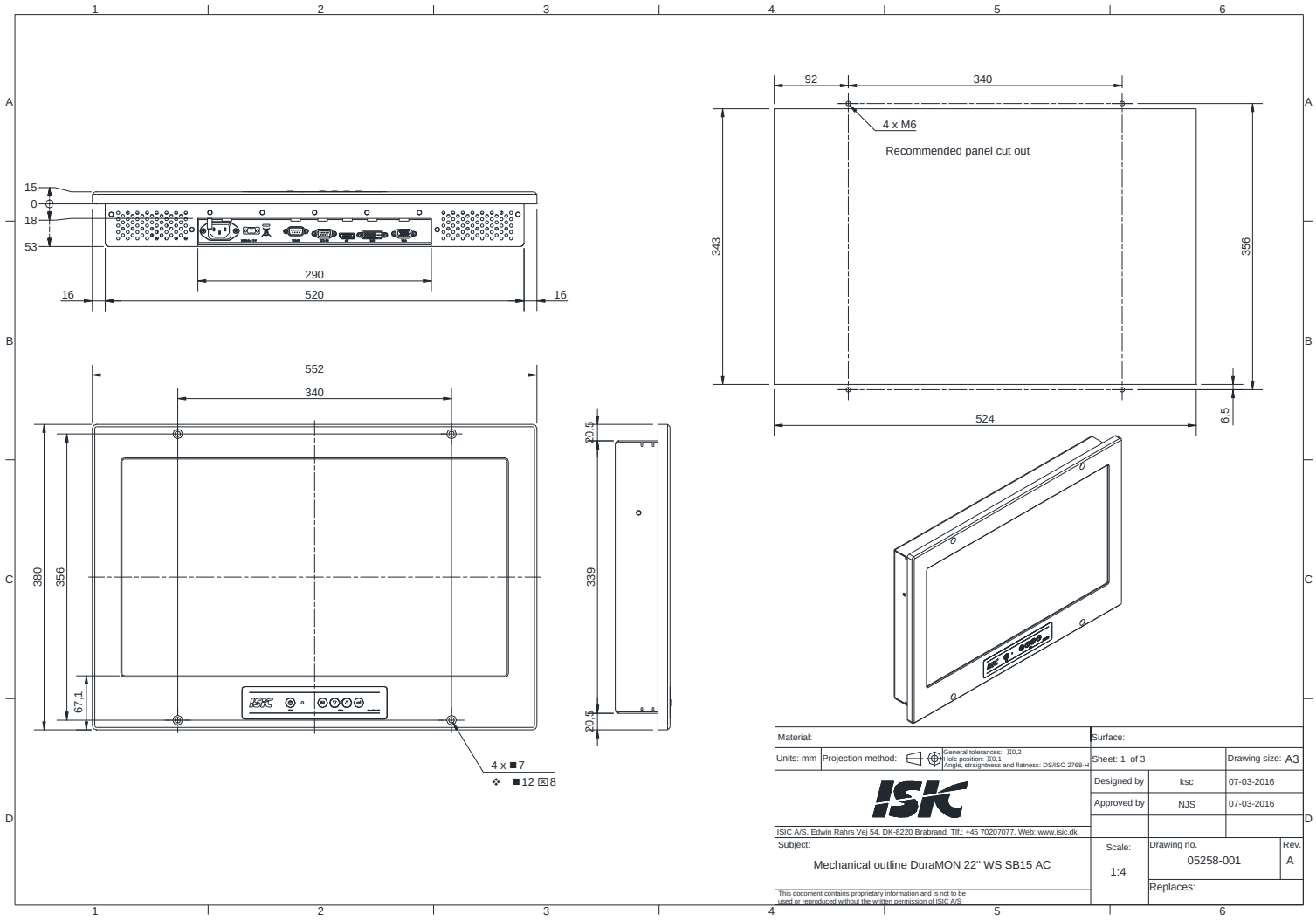
9 Mechanical outline DuraMON 15”



10 Mechanical outline DuraMON 19”



11 Mechanical outline DuraMON 22”



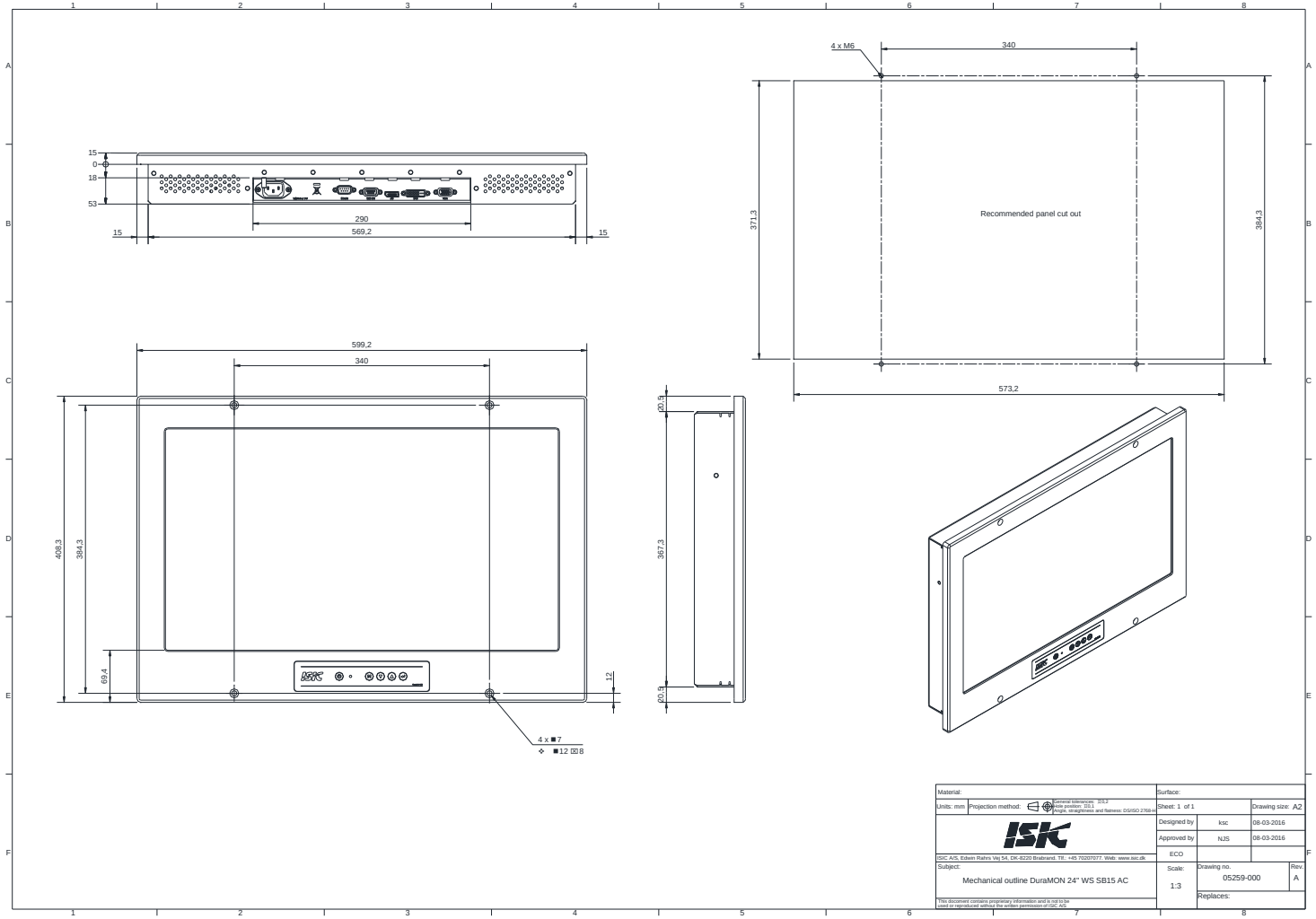
Material:		Surface:	
Units: mm	Projection method:	Sheet: 1 of 3	Drawing size: A3
		Designed by: ksc	07-03-2016
		Approved by: NJS	07-03-2016

ISIC A/S, Edwin Rahrs Vej 54, DK-8220 Brabrand. Tlf.: +45 70207077. Web: www.isic.dk

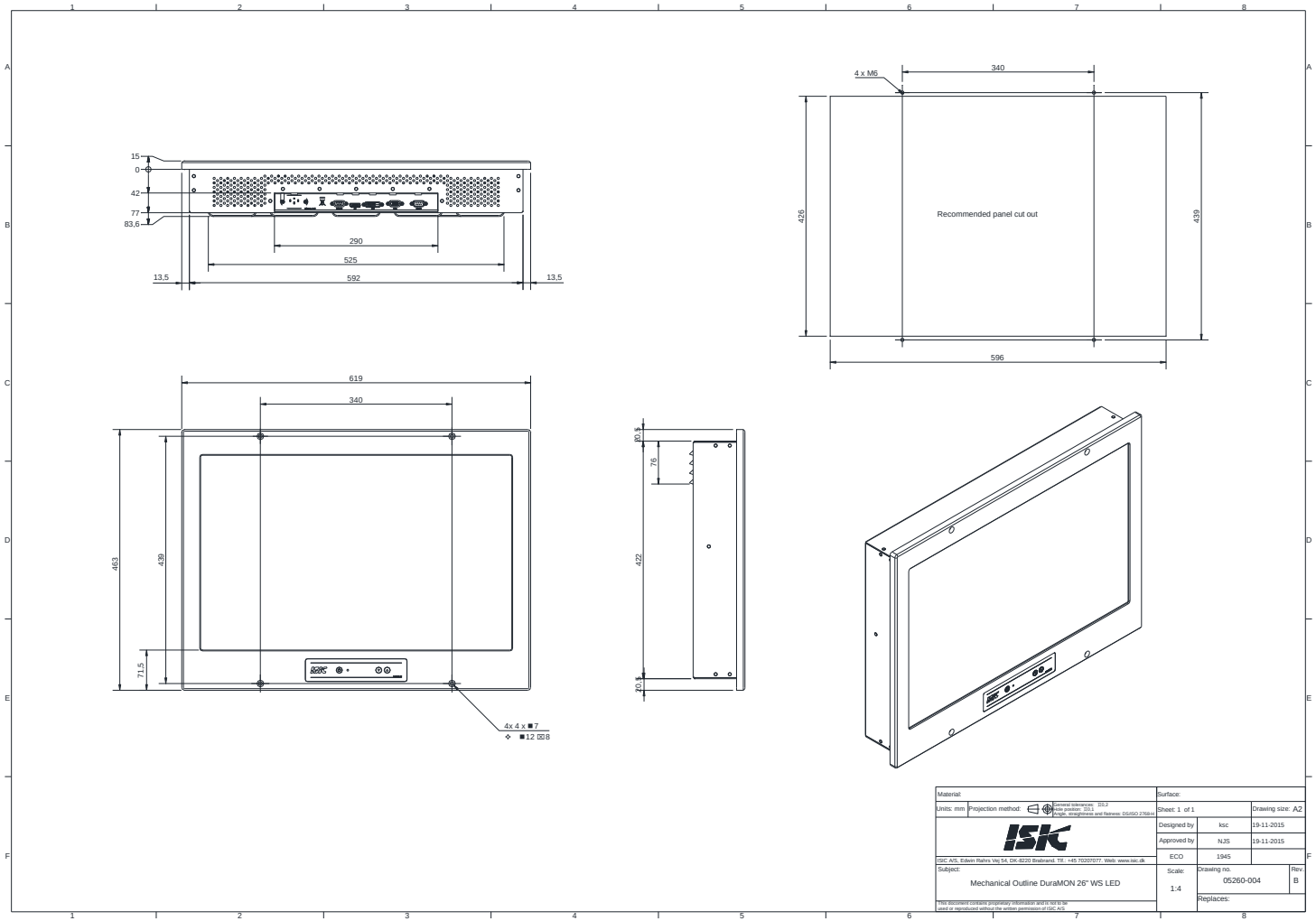
Subject: Mechanical outline DuraMON 22'' WS SB15 AC	Scale: 1:4	Drawing no. 05258-001 Rev. A
		Replaces:

This document contains proprietary information and is not to be used or reproduced without the written permission of ISIC A/S

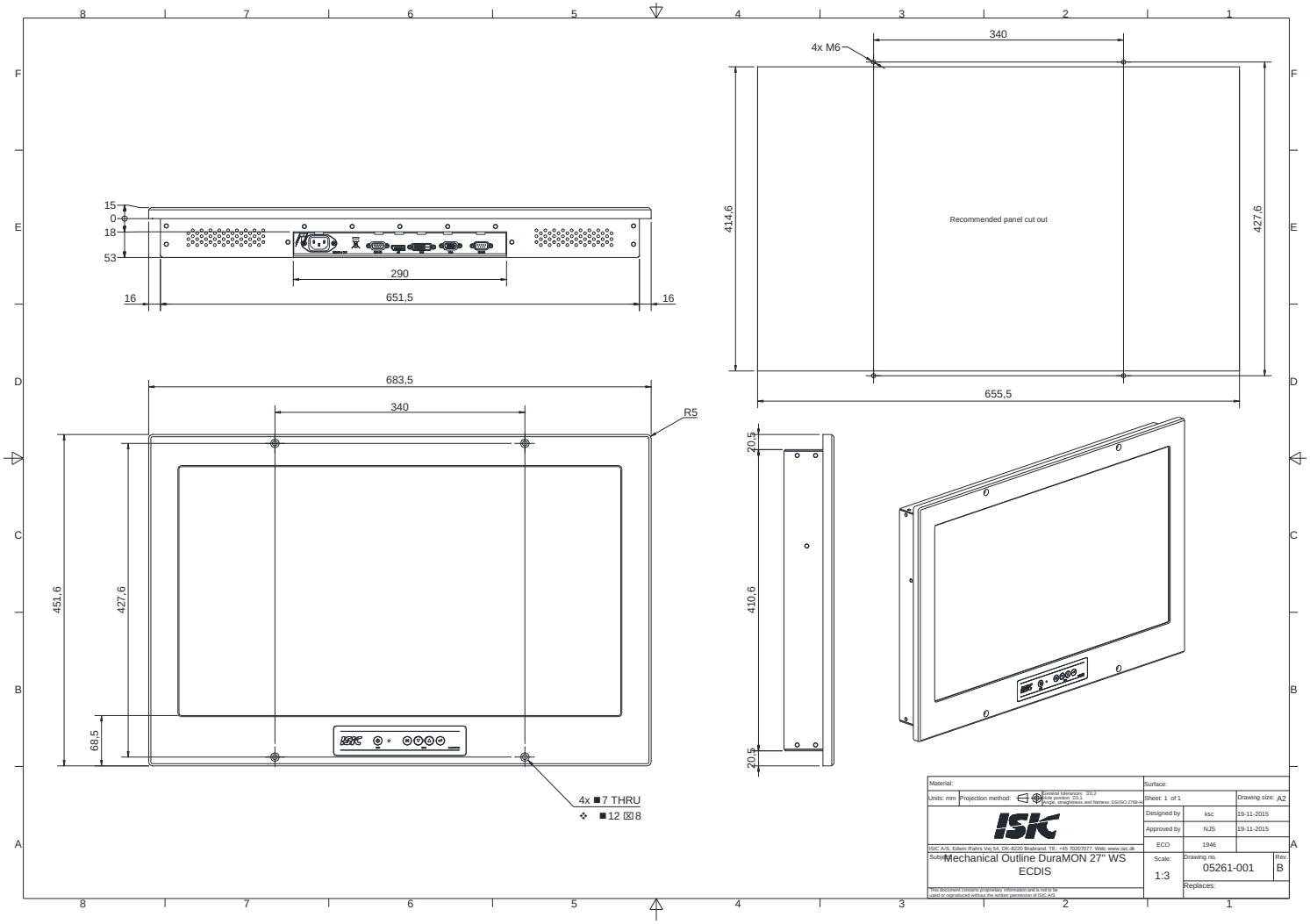
12 Mechanical outline DuraMON 24”



13 Mechanical outline DuraMON 26”



14 Mechanical outline DuraMON 27”



15 Touch screen option (19” only)

The OSD menu on the DuraMON does NOT contain any special entries with respect to the touch functions, as no features are controllable from the monitor itself.
All special functions has to be controlled from the PC

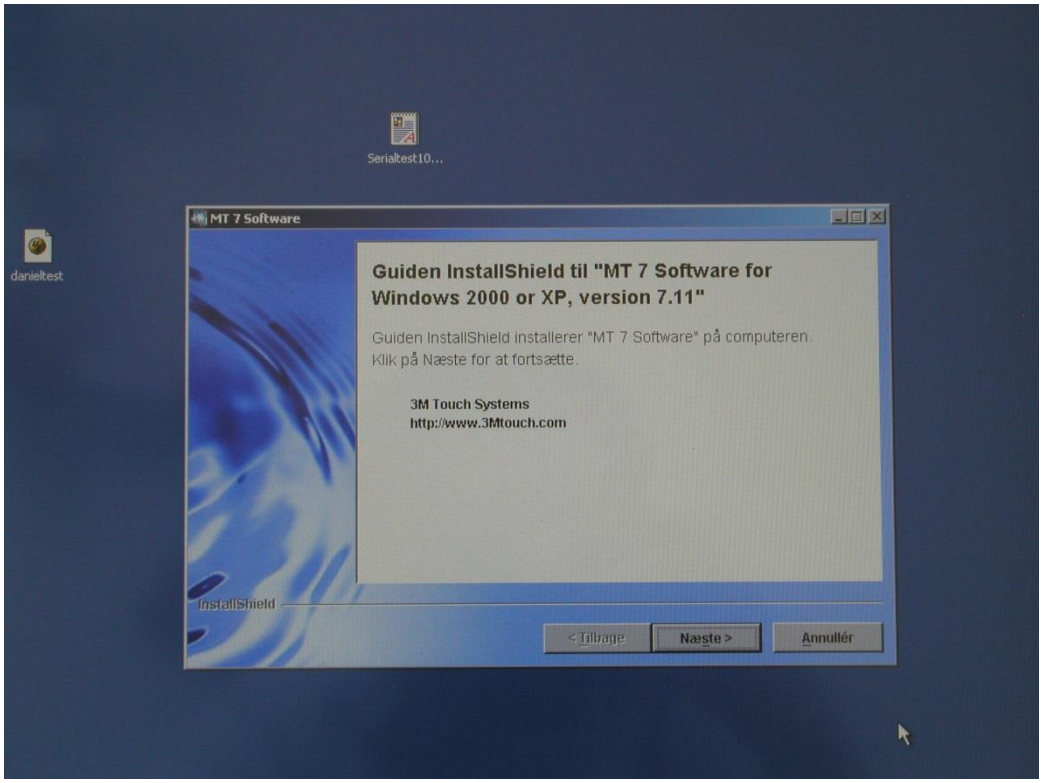
For description of special touch functions and help section, please go to the touch program folder, and select Readme or Help.

The touch screen on the monitor needs only to be connected to a PC via a RS-232 cable.

Touch Screen Software installation

The following instructions are based on the 3M MT7.11 driver.
The driver supports Windows XP and Windows 2000.

Unzip the MT7…. File, and run setup.exe



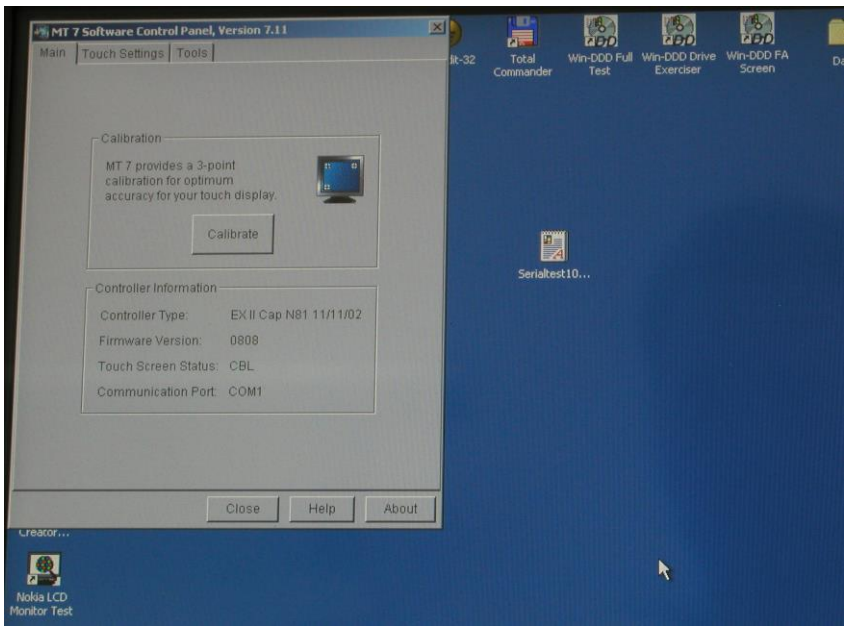
Follow the instructions on the screen.

After having completed the installation, the touch is working immediately.
No reboot is necessary.

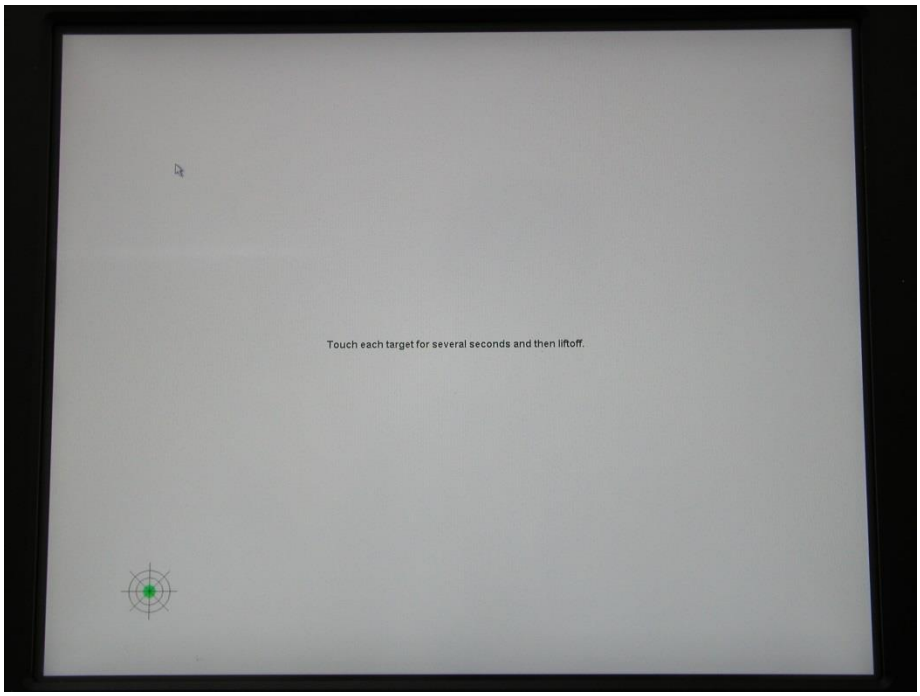
Calibration of Touch Screen

The Touch Screen is calibrated from the factory and normally no recalibration is needed.

If a Calibration is needed, go to the Programs/MT7 Software folder
Select the Control program



Press the Calibrate button, and place your finger at target points.



If the calibration process was not satisfactory, please re-calibrate.

16 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.

17 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	Typ response from monitor
DuraMON 15	DuraMON 15
DuraMON 19	DuraMON 19
DuraMON 22	DuraMON 22
DuraMON 24	DuraMON 24
DuraMON 26	DuraMON 26
DuraMON 27	DuraMON 27

18 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 15	165	115
DuraMON 19	65	35
DuraMON 22	175	110
DuraMON 24	215	140
DuraMON 26	225	135
DuraMON 27	180	110

19 Power Consumption

Test object / condition	Ptyp [W]	Pmax [W]
DuraMON 15	15	20
DuraMON 19	35	40
DuraMON 22	20	25
DuraMON 24	30	35
DuraMON 26	50	55
DuraMON 27	30	35

20 Inrush current

Test object / condition	24 [VDC]	115 [VAC]	230 [VAC]
DuraMON 15	105	55	100
DuraMON 19	105	55	100
DuraMON 22	105	55	100
DuraMON 24	105	55	100
DuraMON 26	105	60	110
DuraMON 27	105	55	100

21 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
No picture on display	No power cord connected	Apply power
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.

22 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.

23 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
HDMI:	High-Definition Multimedia Interface

24 ISIC info / Support

In case you have inquiries or problems with your DuraMON, 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: Fax:	+45 70 20 70 77 +45 70 20 79 76
Mail: www:	isic@isic-systems.com www.isic-systems.com
VAT number:	DK 16 70 45 39
Bank Address:	Handelsbanken A/S Havneholmen 29 DK-1561 København V Denmark
Bank Code: IBAN DKK: IBAN EUR: IBAN USD: SWIFT:	0892 DK53 0892 0001 0159 69 DK48 0892 0003 0026 19 DK26 0892 0003 0026 27 HANDDKKK
Contacts: RFQ's:	 By fax to +45 70 20 79 76 By mail to sales@isic-systems.com
Orders:	By fax to +45 70 20 79 76 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 Authorisation number at homepage http://www.isic-systems.com/aftersales/tech-support-rma/ By mail to service@isic-systems.com

25 Revision history

Rev A	June 2016	First release
Rev B		**Page 14,** corrected vert position and transparency in bottom menu. **Page 18**, view distance for 27" changed to 1.08m

26 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 glass 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:

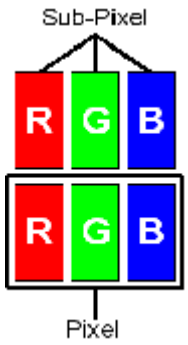
- Final check for pixel fault undertaken right after burn-in, i.e. with pre-heating of the display.
- Surrounding temperature 25ºC ± 5ºC
- Relative air humidity 40–70%

Pixel definition

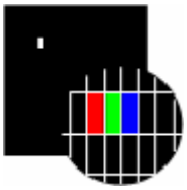
Every pixel consists of three sub-pixels/dots (red, blue, green).

Every sub-pixel has its own transistor.

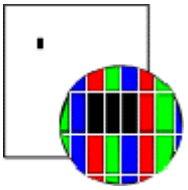
The three sub-pixels/dots must be considered as one unit.



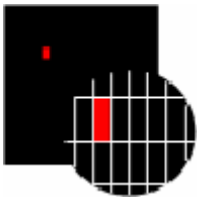
Pixel



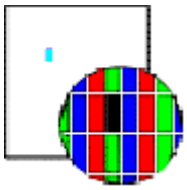
Pixel defect type 1 Pixel constantly lit



Pixel defect type 2 Pixel constantly dark



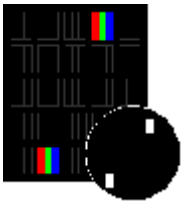
Pixel defect type 3a
Sub-pixel/dot (red, blue, green) constantly lit



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

Cluster

A cluster consists of 5 x 5 pixels.

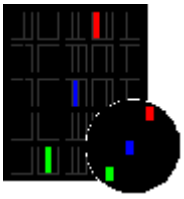


Cluster pixel defect type 1

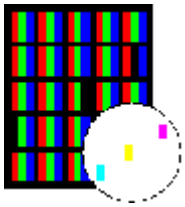
Pixels in a cluster area constantly lit

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**

Edwin Rahrs Vej 54
DK-8220 Brabrand
Denmark
Web: http://www.isic-systems.com
Email: service@isic.dk