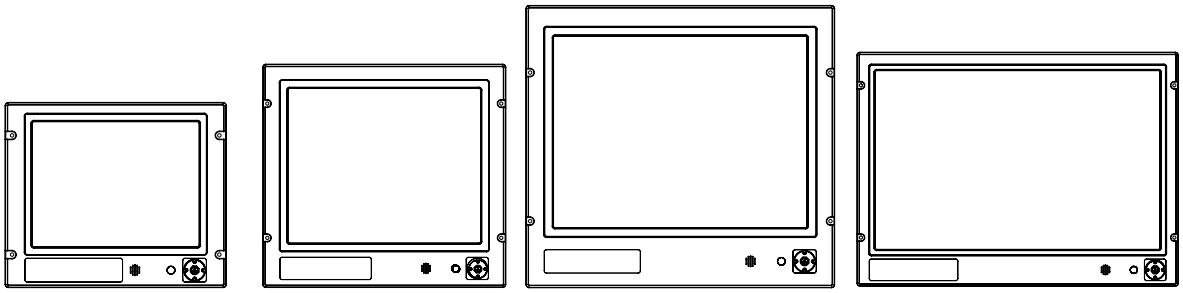
USER MANUAL



Series 1 - Maritime Multi Display Models

JH 15T15 MMD-xxx-Axxx - 15.0 inch Maritime Multi Display
JH 15T17 MMD-xxx-Axxx - 15.0 inch Maritime Multi Display
JH 19T12 MMD-xxx-Axxx - 19.0 inch Maritime Multi Display
JH 19T14 MMD-xxx-Axxx - 19.0 inch Maritime Multi Display
JH 20T17 MMD-xxx-Axxx - 20.1 inch Maritime Multi Display
JH 23T12 MMD-xxx-Axxx - 23.1 inch Maritime Multi Display
JH 27T11 MMD-xxx-Axxx - 27.0 inch Maritime Multi Display Widescreen

User Manual MMD Series 1	
Updated: 13 Nov 2008	Doc Id: INB100036-1 (Rev 6)

Please visit our website for the latest electronic version of this manual.

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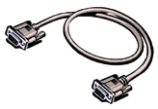
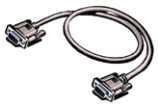
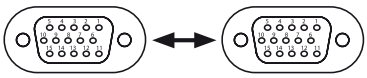
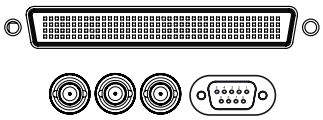
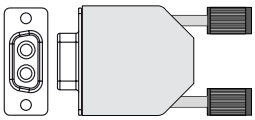
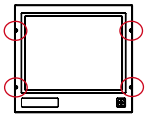
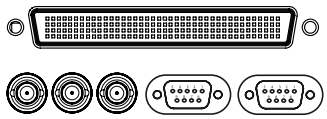
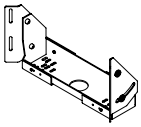
Contents of package

This product is shipped with:

Item	Description	Illustration
	1 pcs of Standard DVI Signal Cable. DVI-D 24P Male to DVI-D 24P Male - Length 2.0m	
	1 pcs of Standard VGA Signal Cable. DSUB 15P Male to DSUB 15P Male - Length 2.0m	
	1 pcs of power cable European Type F “Schuko” to IEC. Length 1.8m *Note: Included in package for models with AC input.*	
	1 pcs of power cable US Type B plug to IEC. Length 1.8m *Note: Included in package for models with AC input.*	
	1 pcs of Standard 160p HATTELAND® Multifunction Cable #1 - Length: 30cm Connectors from the 160pin (male) are: - 3 x BNC Video IN (female) - 1 x 9p D-SUB (female) RS-232 COM I/O *Note: This cable is only included with a product WITHOUT factory mounted touchscreen.*	
	1 pcs of DVI-I > RGB/VGA adapter DVI-I 29P Male to DSUB 15P Female	
	1 pcs of DC Power Input housing with internal cable screw terminal. *Note: Included in package for models with DC input.*	
	1 pcs of printed User Manual.	
	4 pcs of M6X25 pan screws. Suitable for securing the display unit into a console cut-out. See illustration to the right. **DO NOT USE THESE TO MOUNT BRACKETS ONTO THE UNIT.** Use the provided and dedicated screws for accessories (see next table below)	

Package may also include:

Item	Description	Illustration
	1 pcs of Standard HATTELAND® Multifunction Cable #2 - Length: 30cm Connectors from the 160pin (male) are: - 3 x BNC Video IN (female) - 1 x 9p D-SUB (female) RS-232 COM I/O - 1 x 9p D-SUB (female) TOUCH COM I/O *Note: This cable is only included with a product with factory mounted touchscreen.*	
	4 pcs of M6X12 Unbraco bolts. These are included with mounting bracket, if ordered. (See illustration to the right) **Should only be used to secure the bracket onto display.** *If you prefer your own bolts, make sure they do not exceed 12mm in length. Use any longer is not possible due to mechanical limits.*	
	1 pcs of Touch Screen Driver CD. This CD is only included in the package if the model was delivered with a factory mounted touch screen.	

General

Hatteland Display AS

KNOWLEDGE - QUALITY - VALUE

About Hatteland Display

Hatteland Display is the leading technology provider of maritime display and computer products. We deliver high quality, unique and customized solutions to the international maritime market.

The company represents innovation and quality to the system integrators world wide. Effective quality assurance and investment in sophisticated in-house manufacturing methods and facilities enable us to deliver type approved and Mil tested high quality products.

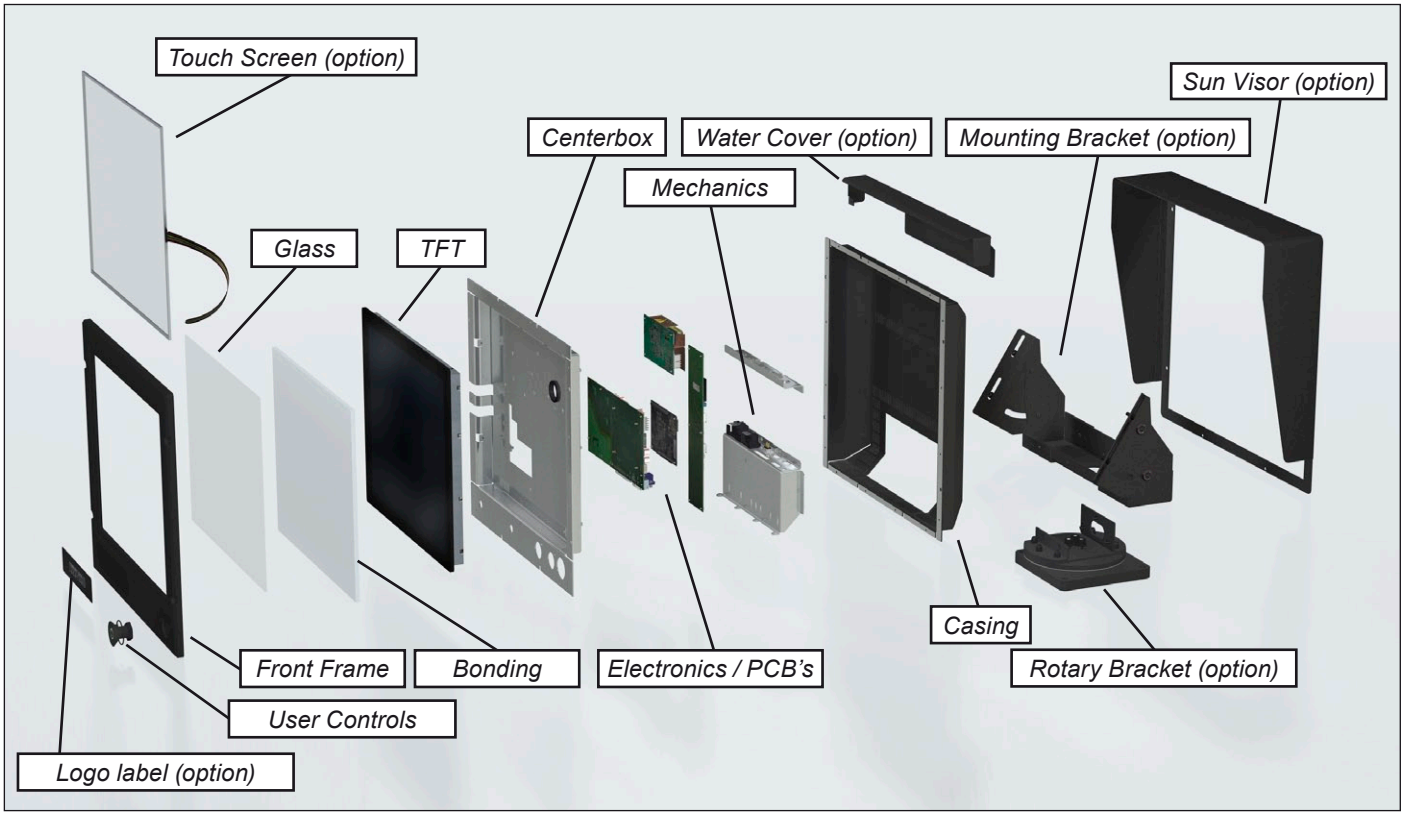
Our customer oriented approach, technical knowledge and dedication to R&D, makes us a trusted and preferred supplier of approved solutions, which are backed up by a strong service network.

About this manual

The manual contains electrical, mechanical and input/output signal specifications. All specifications in this manual, due to manufacturing, new revisions and approvals, are subject to change without notice. However, the last update and revision of this manual are shown both on the frontpage and also in the “Revision History” chapter. Please use that as a reference.

Furthermore, for third party datasheet and user manuals, please see dedicated interactive CD (where included) delivered with the product or contact our sales personnel for support. Please see the Contents Of Package chapter in the beginning of this manual to determine if a dedicated manual CD are included.

Basic Construction - Series 1



Example with mounting bracket

Example with sun visor, mounting bracket and rotary bracket

Touch screen products

Introduction to products with touch screen
Both Resistive and Capacitive touch screen solutions are used for our products. Please visit our website to find your exact type number and then determine if it uses Resistive or Capacitive.
If you have a customized or tailored product, please check the specifications in this manual or third-party specifications from your supplier.

Capacitive Touch screen
The glass overlay has a coating that stores the charge deposited over its surface electrically. It will not operate with either a gloved hand or with a mechanical stylus. Capacitive touch screens operate by applying a small amount of voltage to each corner of the touch screen. When the screen is touched by a human finger it draws a minute amount of current to the X,Y point of contact. This location is calculated by the touch screen controller and transmitted back to the computer connected to the touch screen controller.

CAPACITIVE - Brief Specifications

Subject	Details
Construction	**Top:** ClearTek protective overcoat protects the sensors and increase durability. **Inside:** Electrode X/Y grid pattern and conductive coating. **Bottom:** Glass and conductive coating. Small amount of voltage is applied to the four corners for measuring X and Y coordinates of the touch point.
Positional Accurancy	Reported touch coordinates are within 1.0% of true position. (Based on viewing area dimensions)
Touch Contact Requirements	3 ms for finger input.
Enduarance Tested	More than 225 million touches in one location without noticable degradation to the surface.
Cleaning	Water, isopropyl, alcohol, and similar non-abrasive cleaners.
Liquid Resistance	Liquids on screen does not impede touchscreen performance.
Light Transmission	Up to 88% at 550 nm; dependant on specific surface finish chosen.

Resistive Touch screen
It generally uses a display overlay composed of layers, each with a conductive coating on the interior surface. Special separator “dots” are distributed evenly across the active area and separate the conductive interior layers. The pressure from using either a mechanical stylus or finger produces an internal electrical contact at the “action point” which supplies the controller with vertical and horizontal analog voltages for data input. The resistive touch screens are anti-glare to reduce reflective shine intensity, which will slightly diffuse the light output throughout the screen. Resistive technology activation can be initiated by; a gloved hand, fingernail, mechanical stylus or an ungloved finger.

RESISTIVE - Brief Specifications

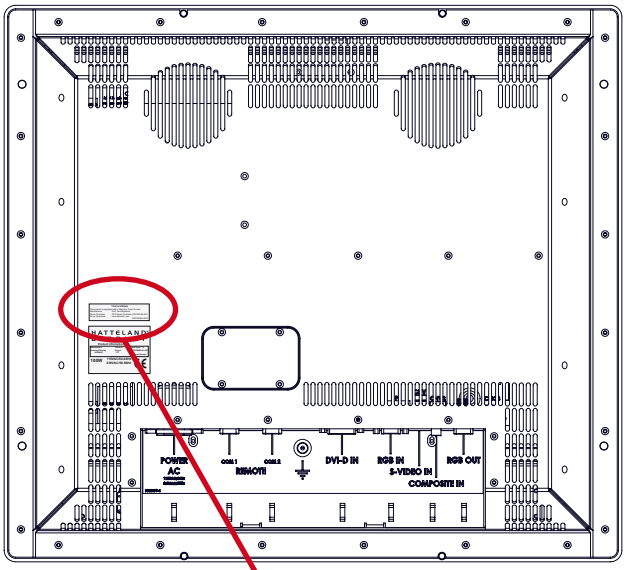
Subject	Details
Construction	**Top:** Polyester with outside hard-surface coating with clear or anti-glare finish. **Inside:** Transparent conductive coating. **Bottom:** Glass substrate with uniform conductive coating. Top and bottom layers separated by separator dots.
Positional Accurancy	Standard deviation of error is less than +- 0.080-inch (2mm).
Touch Activation Force	Typically 57 to 133 g
Expected Life Performance	More than 35 million touches in one location without failure, using a stylus similar to a finger.
Cleaning	Water, isopropyl, alcohol, and similar non-abrasive cleaners.
Chemical Resistance (Exposed for one hour)	Acetone, Common food and beverages, Hexane, Isopropyl alcohol, Methylene chloride, Methyl ethyl ketone, Mineral spirits, Turpentine
Light Transmission	Typically 75% over visible light spectrum.

Touch screen products

Touch screen Technology & Label markings

Information about the factory mounted touch screen and what driver to use, are indicated on the dedicated label on your actual product. The information and location of the label can vary depending on product, this page only decribes the concept.

(This label is attached on products produced after September 2006)



TOUCH SCREEN
This product is equipped with a Resistive Touch Screen:
Manufacturer : ELO TouchSystems
Touch Controller : 2210 Serial Controller P/N 055165-000
Driver Download : www.elotouch.com
VSD100564-2210

Example label only

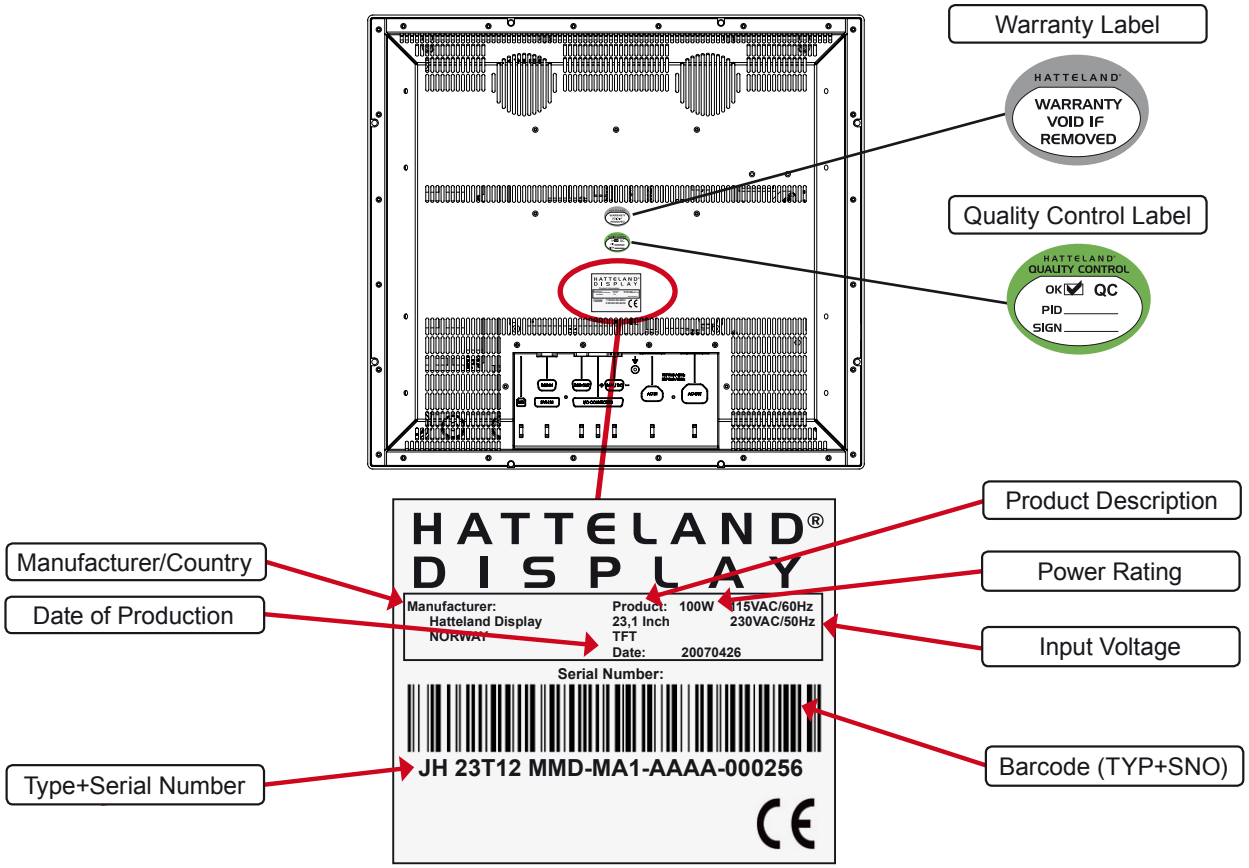
Up-2-date touch screen drivers and documentation:
Touch Screen based products are shipped with a Touch Screen Driver Wizard CD with suitable drivers (menu snapshot shown to the right).

You can also visit our website www.hatteland-display.com to view the same list (or even recently new added products) of our models with touch screen. Before using the touch screen, it should be calibrated for your system. Please install the 3rd party software and use the Calibrate function from there.

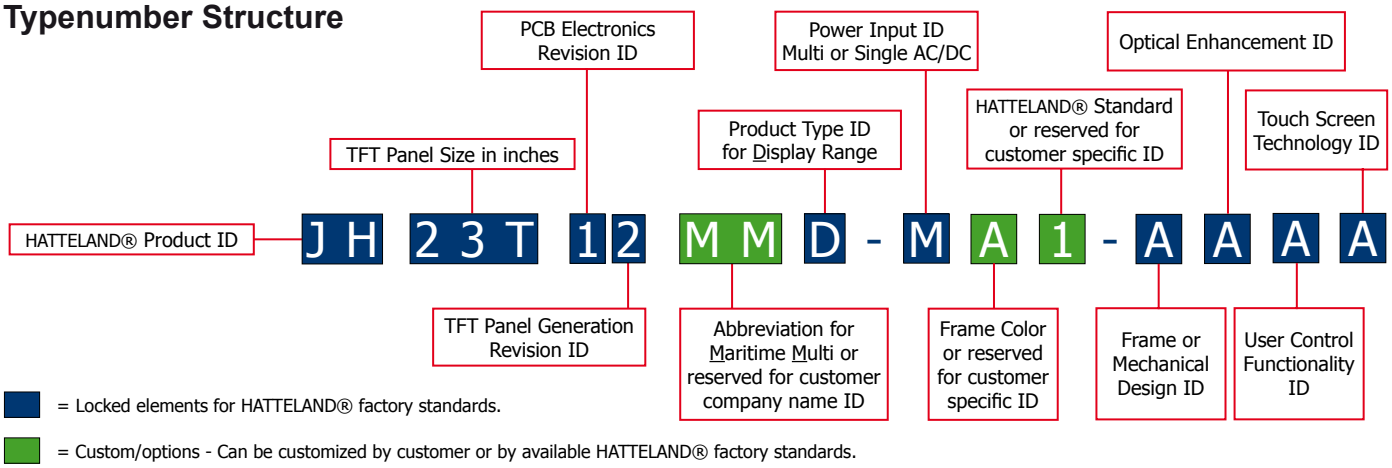
For additional touch controller/screen documentation and possible updated drivers, please visit the 3rd party manufacturer site as found in the Touch Screen Wizard CD menu.

Product Labeling (examples)

Labels and Locations



Typenumber Structure



Warranty Label

If you are to perform service on a unit still under warranty, any warranty will be void if this label show signs of removal attempts (re-gluing) or removed completely. This label is located on the back of the product and covers a key screw. This is to aid service departments to determine if there has been any unauthorized service on a unit still under warranty.

Quality Control (QC) Label

This label indicates that the unit is produced, tested and packed according to manufacturer's QA specifications. It will include a Personal ID and signature by the personnell responsible for approving the unit in production, test and warehouse departments.

Installation

General Installation Recommendations

Installation and mounting

1. Most of our products are intended for various methods of installation or mounting (panel mounting, bracket mounting, ceiling/wall mounting etc.); for details, please see the relevant mechanical drawings.

2. Adequate ventilation is a necessary prerequisite for the life of the product. The air inlet and outlet openings must definitely be kept clear; coverings which restrict ventilation are not permissible.

3. Generally, do not install the unit in a horizontal position (laying down), as this will cause heat to build up inside the unit which will damage the LCD Panel. To prevent this problem we recommend installing the unit in a vertical position (±30 degrees) to improve the airflow through the unit.

4. To further improve the cooling of the unit we recommend installing Cooling Fans underneath blowing upwards into the unit air inlet. This may be required in high temperature applications and also when there is reason to expect temperature problems due to non-optimal way of mounting.

5. Exposure to extreme direct sunlight can cause a considerable increase in the temperature of the unit, and might under certain circumstances lead to overtemperature. This point should already be taken into consideration when the bridge equipment is being planned (sun shades, distance from the windows, ventilation, etc.)

6. Space necessary for ventilation, for cable inlets, for the operating procedures and for maintenance, must be provided.

7. If the push buttons of the product are not illuminated, an external, dimmable illumination (IEC 60945 Ed. 4, 4.2.2.3, e.g. Goose neck light) is required for navigational use. The illumination shall be dazzle-free and adjustable to extinction.

8. Information about necessary pull-relievers for cables is indicated in the Physical Connection section of this manual. Attention must be paid to this information so that cable breaks will not occur, e.g. during service work.

9. Do not paint the product. The surface treatment influences on the excess heat transfer. Painting, labels or other surface treatments that differ from the factory default, might cause overheating.

Ergonomics

1. Adjust the unit height so that the top of the screen is at or below eye level. Your eyes should look slightly downwards when viewing the middle of the screen.

2. Adjust screen inclination to remain gaze angle to the centre of the screen approximately perpendicular to the line of gaze.

3. When products are to be operated both from a sitting position and from a standing position, a screen inclination of about 30° to 40° (from a vertical plane) has turned out to be favourable.

General Installation Recommendations

4. The brightness of displays is limited. Sunlight passing directly through the bridge windows - or its reflection - which falls upon the screen workplaces must be reduced by suitable means (negatively inclined window surfaces, benetian blinds, distance from the windows, dark colouring of the deckhead). However, Series 1 can be offered with optical enhanced technology to reduce reflections and are viewable in direct sun light, but as a general rule the units at the bridge wing area is recommended to be installed or mounted by suitable alignment or bulkhead / deckhead mounting in such a way that reflections of light from the front pane of the display are not directed into the observer's viewing direction.

5. The use of ordinary commercial filter plates or filter films is not permitted for items of equipment that require approval (by optical effects, "aids" of that kind can suppress small radar targets, for example).

6. For ECDIS applications, the minimum recommended viewing distance are as follows: (IEC62288, Part 7.5 Screen resolution)

17 inch = 908mm	19 inch = 1011mm	20 inch = 878mm	23 inch = 1011mm	27 inch = 1000mm	

General mounting instructions

- The useful life of the components of all Electronics Units generally decreases with increasing ambient temperature; it is therefore advisable to install such units in air-conditioned rooms. If there are no such facilities these rooms must at least be dry, adequately ventilated and kept at a suitable temperature in order to prevent the formation of condensation inside the display unit.

- With most Electronic Units, cooling takes place via the surface of the casing. The cooling must not be impaired by partial covering of the unit or by installation of the unit in a confined cabinet.

- In the area of the wheel house, the distance of each electronics unit from the magnetic standard compass or the magnetic steering compass must not be less than the permitted magnetic protection distance. This distance is measured from the centre of the magnetic system of the compass to the nearest point on the corresponding unit concerned.

- Units which are to be used on the bridge wing must be installed inside the "wing control console" protected against the weather. In order to avoid misting of the viewing screen, a 25 ... 50 W console-heating (power depending on the volume) is recommended.

- When selecting the site of a display unit, the maximum cable lengths have to be considered.

- When a product is being installed, the surface base or bulkhead must be checked to ensure that it is flat in order to avoid twisting of the unit when the fixing screws are tightened, because such twisting would impair mechanical functions. Any unevenness should be compensated for by means of spacing-washers.

- The grounding screws of the units must be connected to the body of the ship (ground); the wire used should have a cross sectional area of at least 6 mm^2.

- Transportation damage, even if apparently insignificant at first glance, must immediately be examined and be reported to the freight carrier. The moment of setting-to-work of the equipment is too late, not only for reporting the damage but also for the supply of replacements.

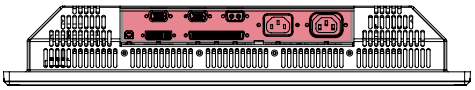
General Installation Recommendations

Cables

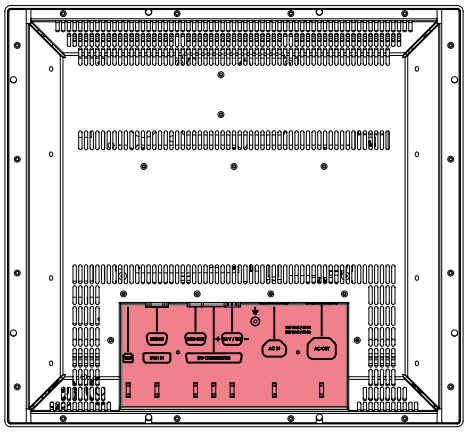
Use only high quality shielded signal cables and the provided HATTELAND® Multifunction Cable.

Cable Entries & Connectors (Marked area) - Illustration only

Bottom View



Back View



Maximum Cable Length

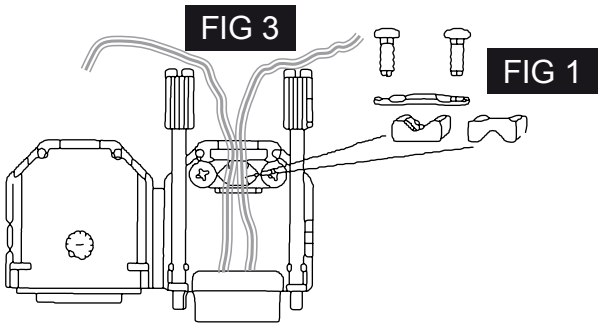
Any cable should generally be kept as short as possible to provide a high quality input/output. The maximum signal cable length will depend on the signal resolution and frequency, but also on the quality of the signal output from the computer/radar. Recommended refresh rate is 60Hz. Cables up to 10 meters generally provides good picture quality even with a 1600x1200 (UXGA) 60Hz signal. In most cases (especially with lower resolutions) even longer cables will provide a satisfactory result. This should however be tested in advance before making the decision on how far the unit can be placed from the signal source.

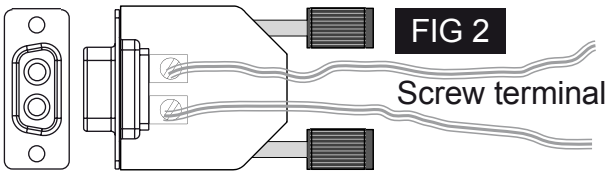
Configuring DC power input housing connector

For installations that require DC power input, use the provided 2-pin DC Power Input housing with internal cable screw terminal.

1: Open the housing
2: Unmount the fasteners. (FIG 1)
3: Mount power cables to screw terminal (FIG 2)
4: Secure the cable tightly with fasteners (FIG 3, FIG 1)
5: Close the housing

Note: Please check polarity before connecting any cables to the screw terminal.

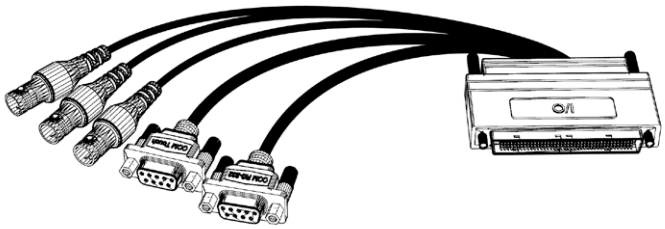




General Installation Recommendations

HATTELAND® Multifunction Cables

This custom HATTELAND® Multifunction Cable with its 160 pins offers a wide range of additional signal types to be used togther with the display units. Please refer to the Contents of Package in this manual to determine which cable and connector functionality you received.

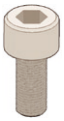


The cable could also be customized upon customer request for length or to support other signal types and connectors. Using any other cable/housing design to connect to the display units could result in severe damage to components! Please use it only with HATTELAND® display products as specified in this manual.

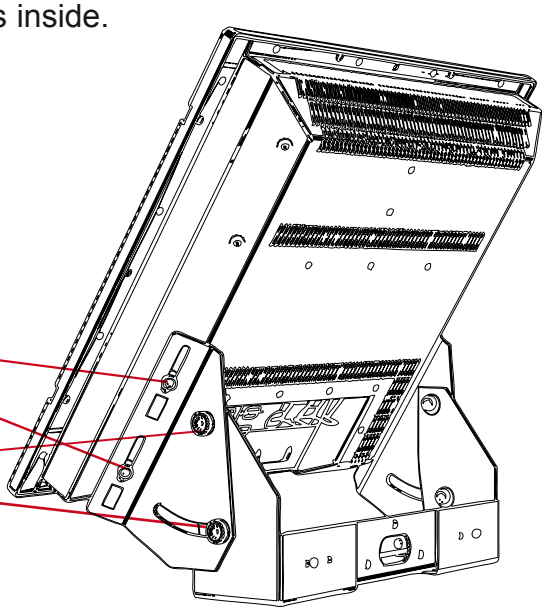
Standard Bracket

When mounting the bracket, the length of the bolts should not exceed 12mm. Using any longer is not possible as the mounting holes on the unit is designed to protect the electronic boards inside.

Mount bolts on each side of the unit.
Make any adjustments before securing the bolts.



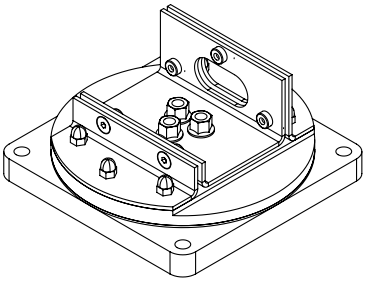
Adjust the tilting angle and secure the bolts.

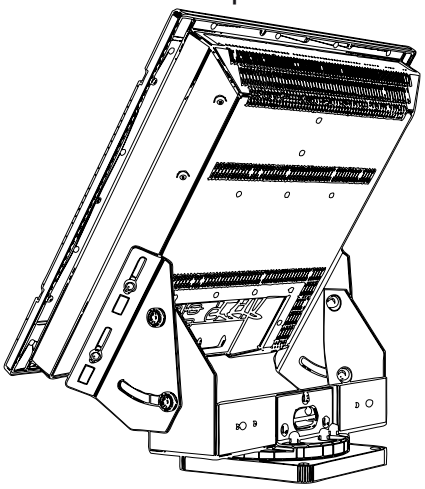


Rotary Bracket

This can only be mounted if the unit is equipped with a standard bracket. Use the provided bolts to secure the rotary bracket.

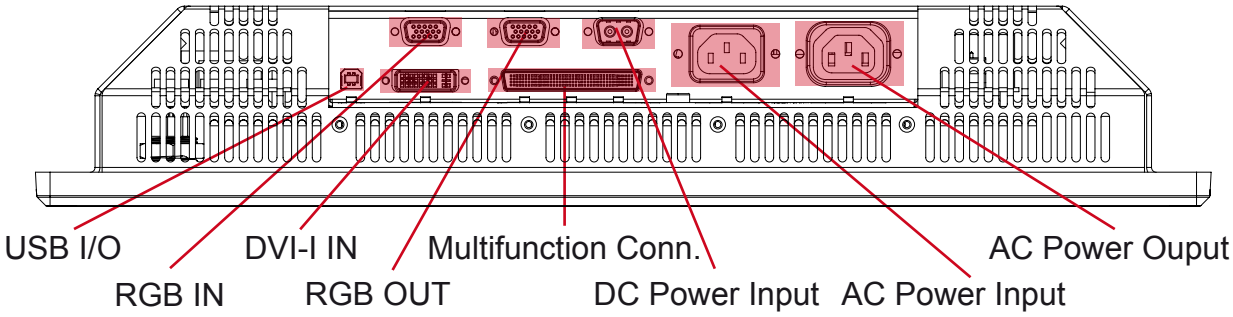
You may choose your own bolts to secure it to a table or desktop, recommended size are: M10 and minimum 30mm in length. The rotary bracket can be rotated 180°





Physical Connections - MMD Based Models

Connection area of display (illustration)



Cable Tension

To reduce tension of the cables you connect, secure them with a cable tie to the base mounted clamp or to the chassis hinges.

For certain models a base mounted clamp is available (FIG 1). For other models a hinge in the chassis is available (FIG 2).

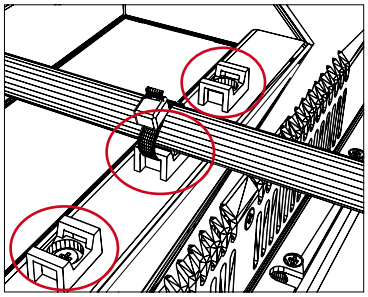


FIG 1

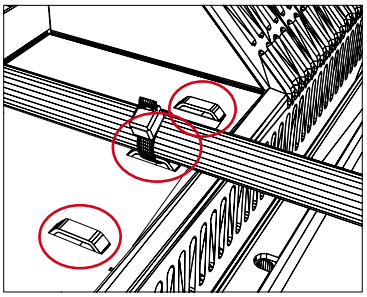
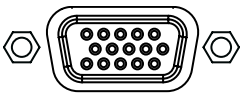


FIG 2

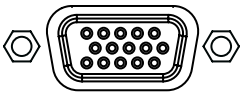
USB I/O:

This USB TYPE B connector is reserved for customized solutions. One customized example could be to connect it to a computer USB connection via a TYPE B-A cable and then accessing it via a front USB TYPE A connector on the front frame bezel to utilize a mouse or other control device.



RGB IN:

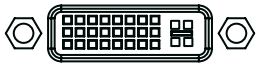
Connect the VGA cable to the D-SUB 15P Connector (female). Secure the VGA cable to the hex spacers provided on the unit and make sure you do not bend any of the pins inside the connector when connecting. Connect the other end of the cable to the VGA connector on your equipment and secure it.



RGB OUT:

RGB OUT enables a direct clone of the incoming VGA (RGB1) signal. Connect the cable to the D-SUB 15P Connector (female) and secure it to the hex spacers provided on the unit. Connect the other end to your equipment and secure it. Note that DVI inputs is NOT cloned, even though if the DVI-I connector has been configured with the DVI-I > RGB adapter to use a RGB signal as input.

Physical Connections - MMD Based Models

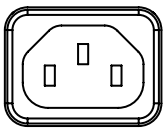


DVI-I IN:

Connect your DVI cable to the DVI-I 29P Connector (female). The DVI-I connector can function as regular RGB IN by using a DVI-I > RGB/VGA adapter. Secure the DVI cable to the hex spacers provided on the unit and make sure you do not bend any of the pins inside the connector. Connect the other end of the cable to the DVI connector on your equipment and secure it.

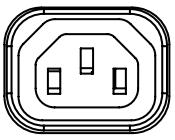
Important note for DVI signal detection:

Please note that for the operating system to detect DVI signals correctly, the DVI cable MUST be connected physically to the display unit during boot up otherwise you may experience a black image. Furthermore certain graphics drivers may need to refresh their device list (often done manually by user - detect devices), while in some cases the Plug-n-Play will automatically detect the DVI signal correctly. Please consult your local technician if you have this behaviour of detection problems when using DVI. In all cases the problem can be solved in the operating system, and this is not a malfunction in the graphic controller for HATTELAND® units.



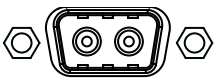
POWER INPUT: (For models supporting AC input)

The internal AC power module supports both 115VAC/60Hz and 230VAC/50Hz power input. Please check specifications for your product.



POWER OUTPUT: (For models supporting AC output)

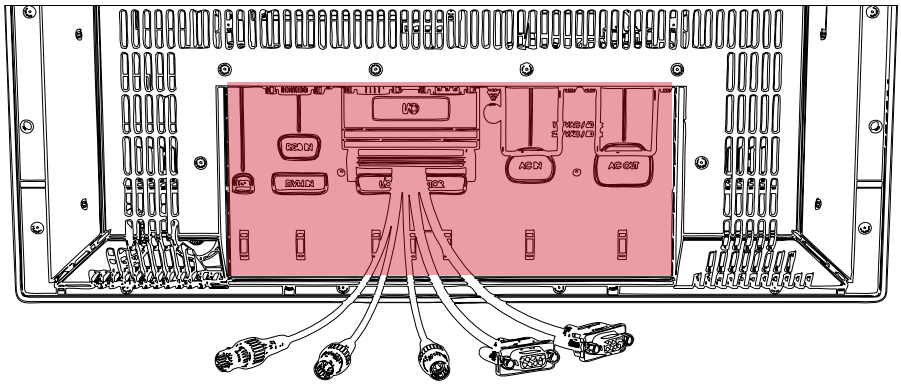
The internal AC power module supports both 115VAC/60Hz and 230VAC/50Hz power input. Please check specifications for your product.



POWER INPUT: (For models supporting DC input)

Connect your DC power cable to the 2P Amphenol FCC17 D-SUB Connector (male). Secure the cable to the hex spacers provided on the unit, and secure the other end to your power supply. The internal DC power module supports 24VDC. Please check specifications for your product.

Physical Connections - MMD Based Models



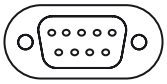
Note: Other HATTELAND® Multifunction Cables may include other connections based on a customized solution.

 **HATTELAND® MULTIFUNCTION CONNECTOR** :

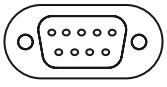
Mount the 160 PIN cable connector (male) to the 160 PIN connector (female) on the back of the unit as indicated above. Make sure you fasten it firmly with the provided housing screws to the hex spacers provided on the unit. By using this cable you can access more signal types than already present by the factory mounted connectors. By factory standards two cables are available. One for non-touch screen based products and one for units with factory mounted touch screen. From this cable you can now have access to the following signal types described below.

 **3 x COMPOSITE IN/VIDEO IN** (Cable #1/#2)**:**

Connect your BNC cable connector (male) to any of the 3 available BNC Connectors (female) on the unit. This will allow 3 different video signals from i.e. cameras & dvd players to be visible on screen either as full screen video or Picture-In-Picture/Picture-By-Picture. To activate any of these functionalities, the unit must be configured via the OSD menus (see own chapter). PAL / NTSC / SECAM VIDEO signal formats supported.

 **COM RS-232 (MMD I/O)** (Cable #1/#2)**:**

This 9P COM connector provides additional functionality for the unit. The MMD I/O - Serial Remote Control features a RS232 interface for controlling internal MMD parameters like brightness. You can access most of the parameters available in the OSD menu and with special commands control the display unit externally. A in-depth manual (when made available) can be located at the website: www.hatteland-display.com (support/accessories) for the SCOM interface. This COM can also be used to upgrade the firmware for the graphic controller inside the unit which is available on request and through service channels (for qualified personnell).

 **COM TOUCH** (Cable #2)**:**

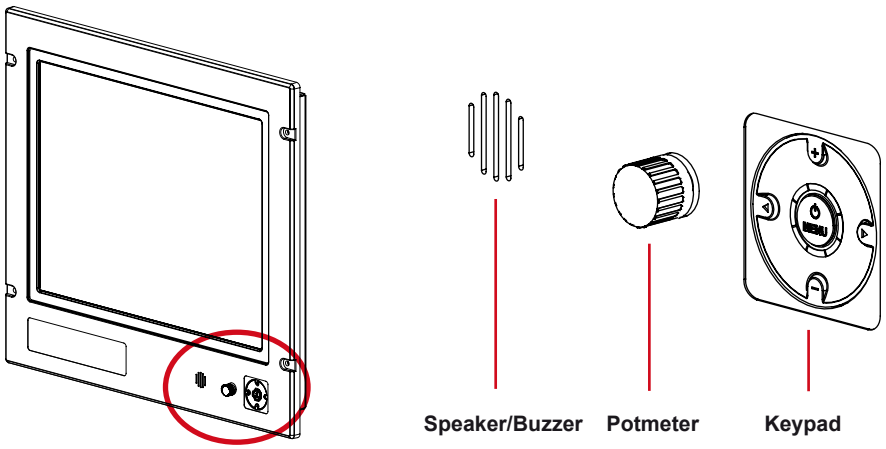
This 9P COM connector provides touch screen communication for display units that have been equipped with a factory mounted touch screen. It should be connected to a computer with touch screen drivers installed. See the touch screen chapter in this manual for more information.

Operation
MMD Based Products

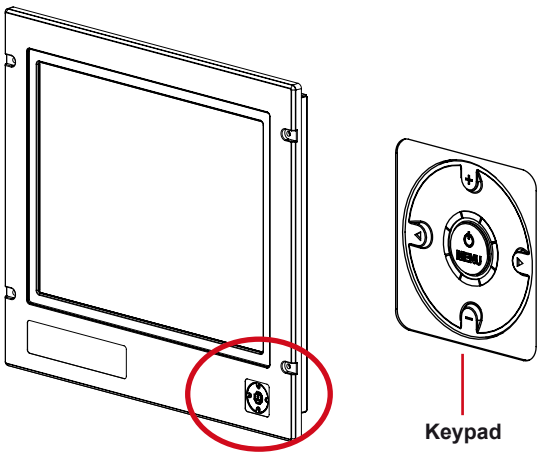
User Controls

USER CONTROLS OVERVIEW

The units are available in two different factory user control configurations as illustrated below.



#1: Potmeter & buzzer (introduced Q4 2008) including keypad controls with its Status LED Ring. Brightness for the unit is adjusted by using the potmeter. The tactile keypad control provide access to the configuration menu and hotkey functionality. The speaker/buzzer function provide audible alarm functionality routed via the HATTELAND® Multifunction Cable.



#2: The tactile only keypad controls with 5 push buttons (introduced Q2 2007) and the Status LED Ring. The keypad provide the user to control brightness, access the configuration menu and use the hotkey functionality. The LED ring will provide feedback for various status or modes that the unit can or currently operates in.

Power ON:

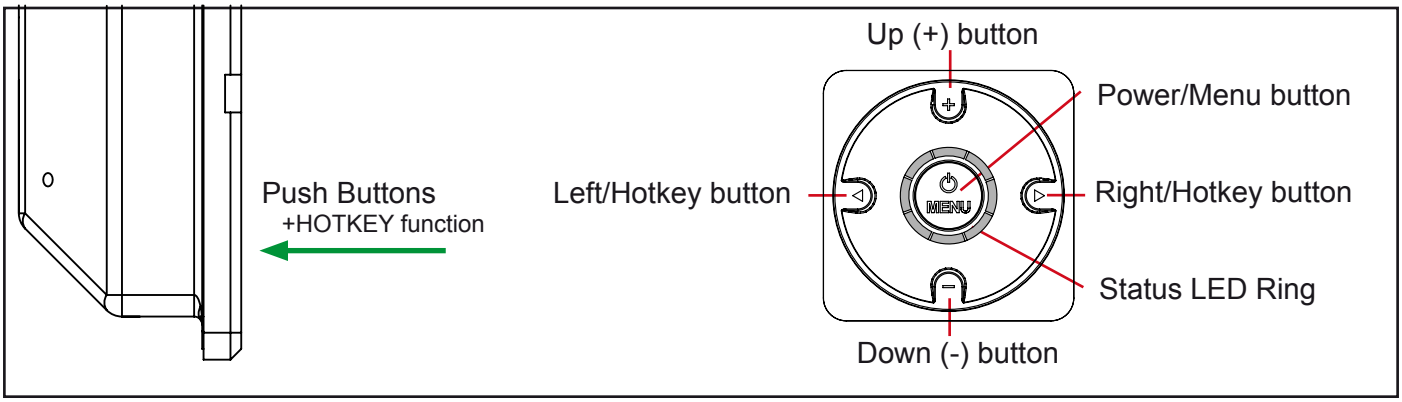
To turn the unit on, push the navigator MENU button inwards and release it instantly. The unit will start searching for signal sources. A green led will move around the led ring to indicate the search procedure. Please consult the STATUS LED overview later in this chapter for the various LED patterns that can occur.

Power OFF:

To turn the unit off, push the navigator MENU button inwards and hold it down for 6 seconds. After the first 3 seconds the menu will appear. 3 seconds later the unit is turned off and all LED indicators will turn red. You can now release the power button. Please consult the STATUS LED overview on the next page for the various LED patterns that can occur.

User Controls

KEYPAD FUNCTIONALITY



MENU function as:
Power On/Off & On Screen Display (OSD) menu access.

LEFT (◄) function as:
Hotkey, exit the current function and navigate to the previous OSD menu.

RIGHT (►) function as:
Hotkey, enter sub-menu & execute/set selected function.

UP (+) function as:
Increase brightness, adjust positive values, visual movement, OSD menu navigating upwards & confirm.

DOWN (-) function as:
Decrease brightness, adjust negative values, visual movement, OSD menu navigating downwards & confirm.

HOT KEY FUNCTION

You can access a number of functions from within the OSD Menu which is normally only accessible by browsing through the OSD Menu and locate the function manually. The hotkey are assigned to both the Left and Right buttons. Pressing either one of these have the same effect.

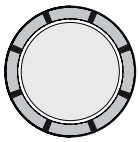
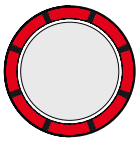
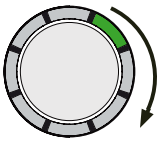
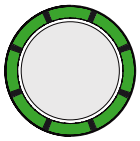
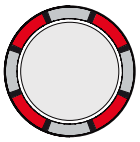
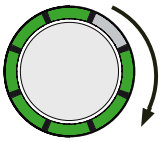
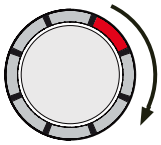
To activate the hotkey functionality, just press one of the buttons inwards and release it instantly, detection time is immediate.

Available assigned functions are: **Brightness, PIP Size, Main Source, Second Source, Alpha Blend, Video Scaling, Swap Source, Test Pattern and No Function.** Please review the “OSD Menu Function” section on how to configure the hotkey functionality.

Status LED Overview

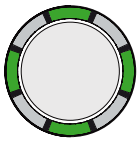
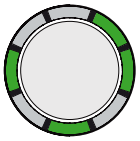
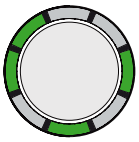
Status LED Overview

The unit features a multi purpose indicator LED status ring which through different patterns and realtime activity gives back the status of the signal detected, power on/off, calibration, menu activity and more. The LEDs are multicolored which either illuminate green or red, based on the activity.

OFF (No power connected)  8 LED OFF	**OFF (Standby, power detected)**  8 RED LED STATIC ON	**ON (Signal Search)**  1 GREEN LED MOVEMENT looping.
ON (Signal OK)  8 GREEN LED STATIC ON	**ON (No Signal)**  4 RED LED STATIC ON	**ON (Menu Delay)**  7 GREEN LED STATIC + 1 LED OFF MOVEMENT doing 1 loop.
OFF (Shutdown)  1 RED LED MOVES for 3 sec. After additional 3 secs, all leds turns RED.		

For ECDIS Calibrated Products

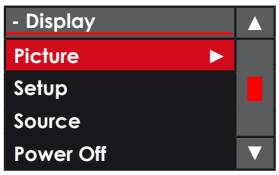
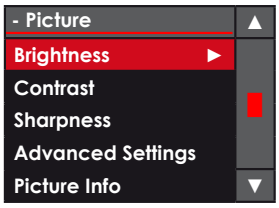
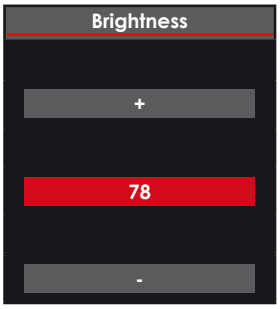
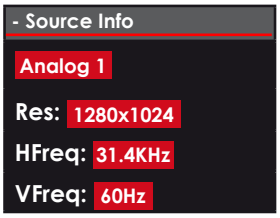
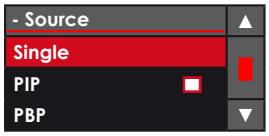
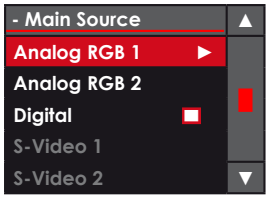
For units that are ECDIS calibrated from factory, the following LED pattern (Calibrated) indicates that the backlight/brightness is at calibrated level. **(Calibrated +)** or **(Calibrated -)** means that the brightness adjustment value is above or below the calibrated brightness level. Fine adjust the brightness in terms of decreasing or increasing the value until the pattern for **(Calibrated)** is reached.

ON (Calibrated)  4 GREEN LED STATIC ON	**ON (Calibrated +)**  4 GREEN LED STATIC ON + where 1 show BRIGHTNESS INDICATION POSITION	**ON (Calibrated -)**  4 GREEN LED STATIC ON + where 1 show BRIGHTNESS INDICATION POSITION

OSD Menu Overview

OSD Menu Quick Start

To understand the workflow of the OSD menu, follow these steps for a quick start. The table shows the various OSD overlays you might encounter while navigating, adjusting parameters or when text messages are displayed. The OSD menu always remembers its last position which is indicated by the red bar.

1	Press the **physical MENU** button for 3 sec. The OSD menu will pop-up as a overlay over the existing image on screen. All the available functions you can adjust or control are now available as an easy understandable menu structure. The current choice will be marked with a red selection bar. You can now navigate up or down in the menu with the **physical up/down buttons** (indicated as **+/-** symbols on the user control). To select a function, press the **physical right arrow button**. You will now enter the sub menu of that function or execute it (if its available).	  The arrow indicates either a sub-menu or function is available. It is now required to press the **physical right button** to access the function / sub-menu.
2	The top header will indicate what the contents of the menu group consists of. In this example **"-Picture"**. The previous menu will not be visible. To navigate to the previous menu, press the **physical left arrow button**. The first choice in the sub-menu will be marked with a red bar. Navigate with the **physical up/down buttons** (indicated as **+/-** symbols on the user control). To select a function, press the **physical right arrow button**. You will now enter the sub menu for that function or execute it (if its available).	
3	*Example of the adjust parameter OSD overlay:* Use the **physical up/down** (indicated as +/- on the user control) buttons to adjust the value. All changes happen in real-time while adjusting these parameters and the number in the middle of the OSD will also change real-time. After you are satisfied with the value, press the **physical left arrow button** to store the parameter. Depending on the function, you will now either enter the previous menu or exit from it completely.	
4	*Example of the text information OSD overlay:* After you have read the information displayed, press the **physical left arrow buttons** to enter the previous menu and exit the information displayed.	
5	*Example of the indicator symbol (white box):* When you have several parameters to choose from, the white box will indicate which parameter are now currently activated. In this example; The "PIP" function is configured to be active. To active any other function, just navigate to it press the **physical right arrow button.** The box will appear next to the text indicating it is activated.	
6	*Example of a non active function (greyed out text):* Please note that certain functions may be disabled by factory default or by means of customized menu structure/product setup. These functions cannot be accessed or executed when they appear in gray text color. In this illustration the S-Video inputs are disabled in the OSD menu as the product does not have any physical S-Video input connectors.	
7	To exit from the OSD menu at any menu level or in any other OSD overlay, just press the **physical MENU button**. The menu will disappear, and the last setting adjusted will be stored. Alternatively you can wait for the OSD to reach time-out and exit automatically without user interaction. Parameters will be saved.	

OSD Menu Overview

OSD Functions Map

The OSD menu consists of main function groups with sub menu groups. On the following pages a complete map of the available functions is shown. The following section should be viewed in color. Please note that the red selection bar is not indicated in any of the following illustrations.

Please note: Factory default illustrations only! Available functions, icons and text may deviate slightly from actual OSD menu on your product due to different OSD software configurations and customized solutions.

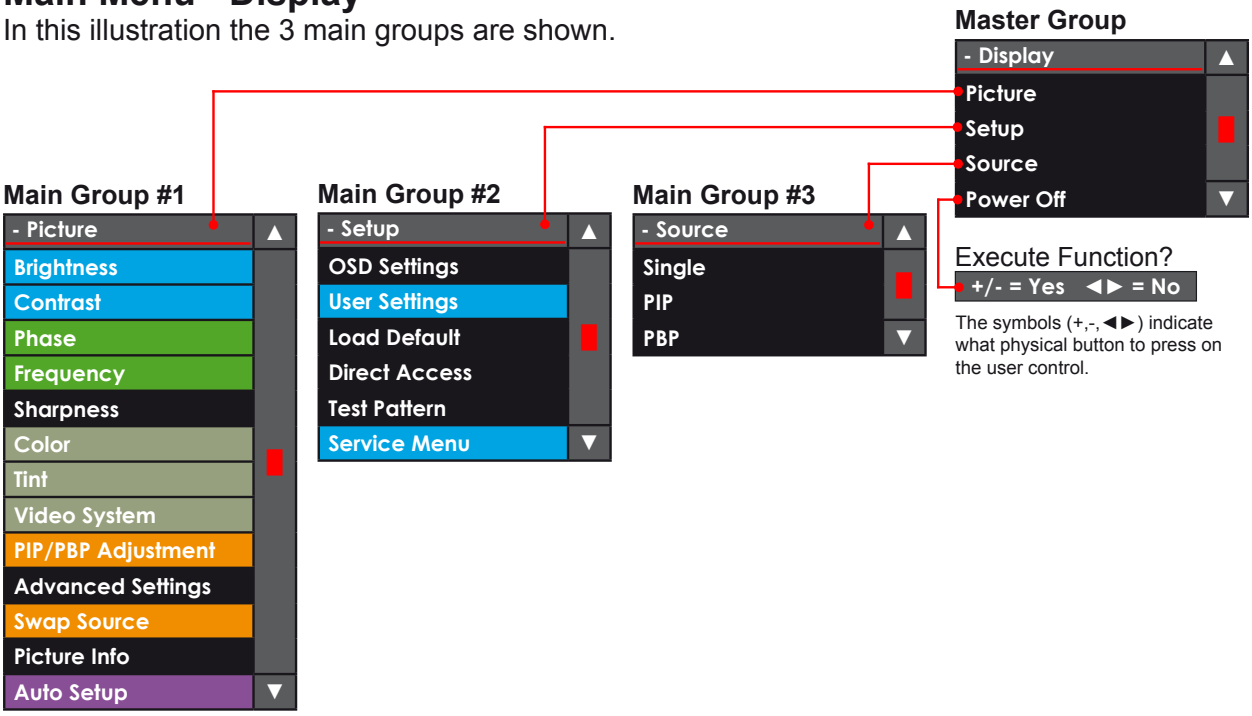
Legend Map

The OSD menu have functions that are specific for RGB mode, DVI mode or when using the “Full” or “Simplified” menu structure. This means that not all functions shown in the menu structure is available in all modes. To easier identify which function is available in what mode, the illustrations in this section is marked with different colors (legends). These colors are not visible in the real OSD menu.

= Always available for all modes.
= Always available for all modes.
= Only available in “Full” menu mode.
= Only available in RGB mode, i.e. VGA/RGB signal input is shown full screen.
= Only available in “Full” and RGB modes.
= Only available in DVI/RGB mode.
= Only available in Comp/S-VHS mode, i.e. Video Signal is shown full screen.
= Only available if Picture-In-Picture (PIP) or Picture-By-Picture (PBP) is on.

Main Menu - Display

In this illustration the 3 main groups are shown.

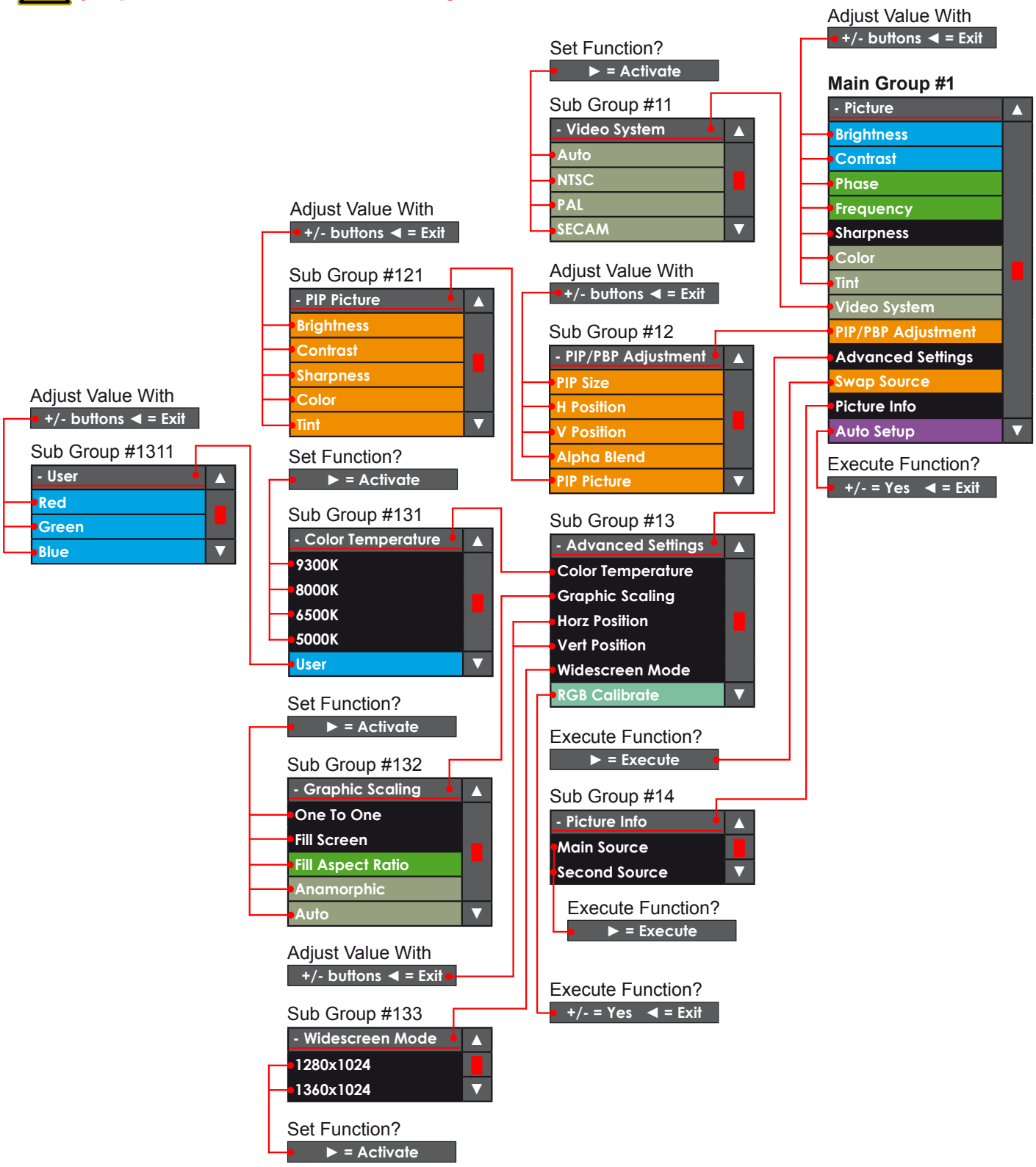


OSD Menu Overview

Main Group #1 - Picture

In this group (with its sub groups) the user can adjust parameters that directly impact the picture visually for all incoming signal sources. Some of these Sub Groups have more options, please review this map to quickly determine the location of your desired function/option. For detailed information, please review the "OSD Menu Functions" later in this section.

Please note: Factory default illustrations only! Available functions, icons and text may deviate slightly from actual OSD menu on your product due to different OSD software configurations and customized solutions.

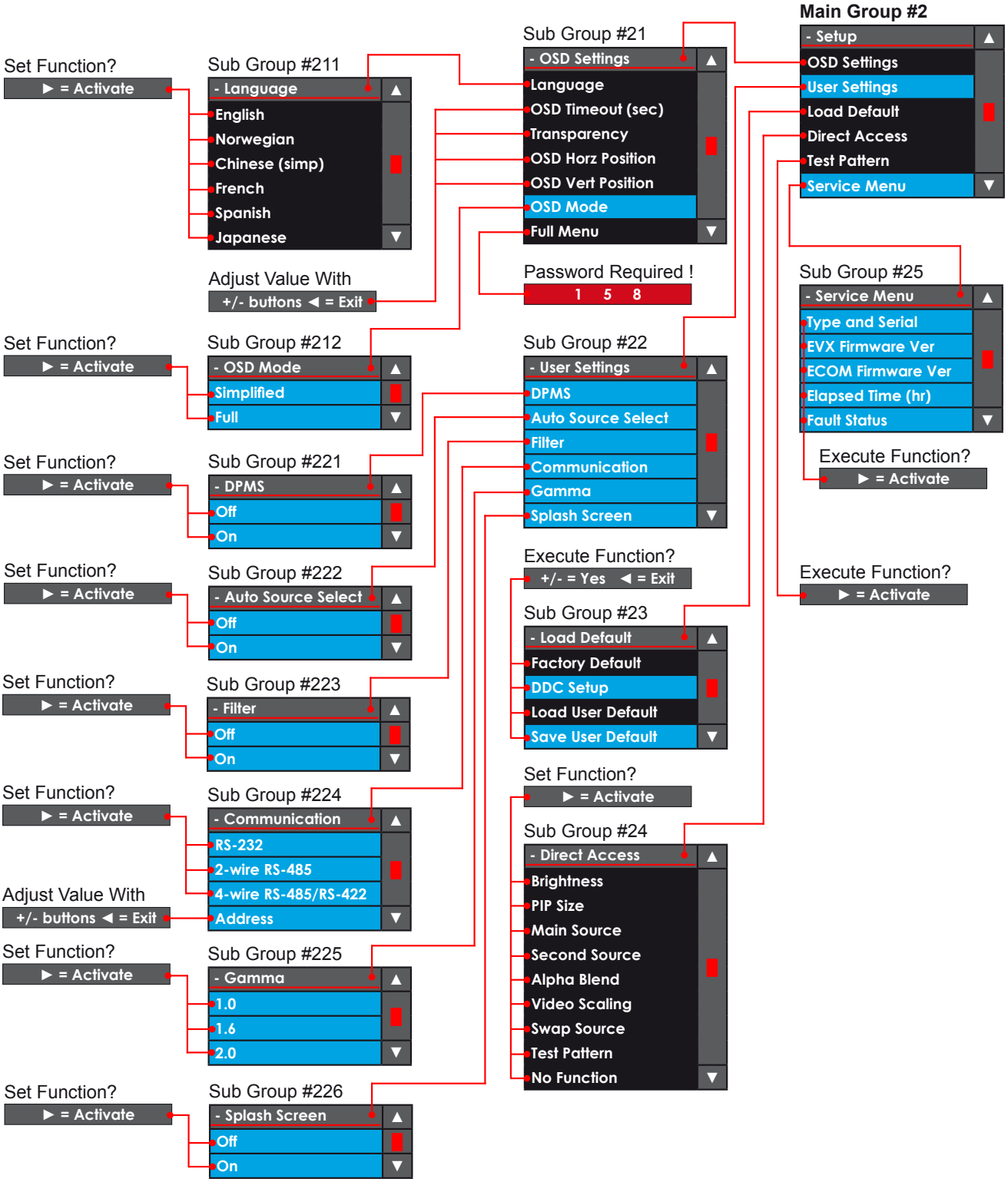


OSD Menu Overview

Main Group #2 - Setup

In this group (with its sub groups) the user can adjust parameters that directly impact settings for the video controller software, OSD settings and gain access to settings that are physically accessible for the user. None of these settings will impact on the picture visually for the incoming signal sources. Some of these Sub Groups have more options, please review this map to quickly determine the location of your desired function/option. For detailed information, please review the “OSD Menu Functions” later in this section.

Please note: Factory default illustrations only! Available functions, icons and text may deviate slightly from actual OSD menu on your product due to different OSD software configurations and customized solutions.

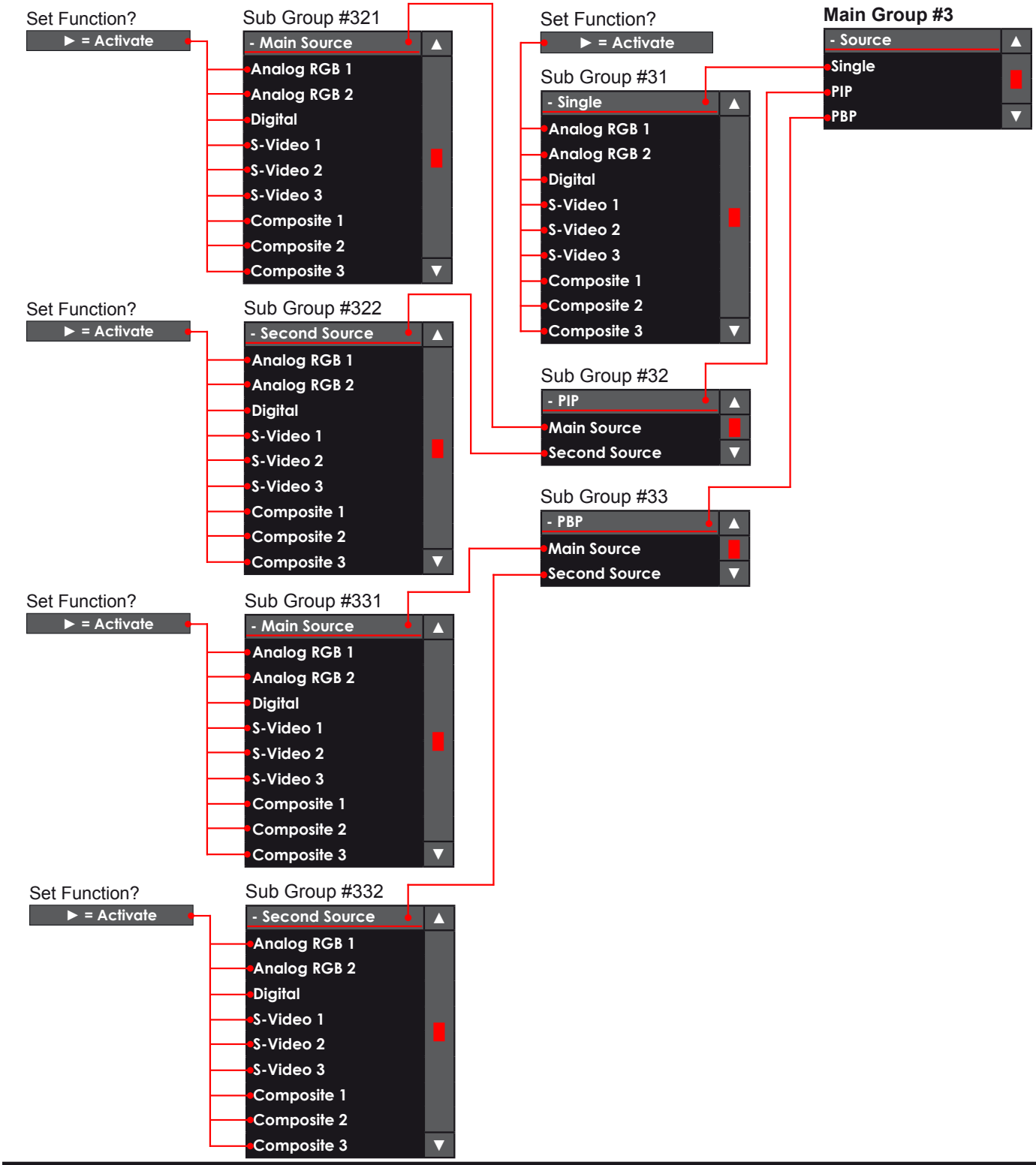


OSD Menu Overview

Main Group #3 - Source

In this group (with its sub groups) the user can change the signal input source and setup the Picture-In-Picture views or Picture-By-Picture views which both take advantage of the Maritime Multi Display functionality. Some of these Sub Groups have more options, please review this map to quickly determine the location of your desired function/option. For detailed information, please review the “OSD Menu Functions” later in this section.

Please note: Factory default illustrations only! Available functions, icons and text may deviate slightly from actual OSD menu on your product due to different OSD software configurations and customized solutions.



OSD Menu Functions

OSD Menu Functions

The following section covers all possible settings that the user can (in a certain mode) encounter or needs to adjust. The structure of these commands are identified as paths. Please review the “OSD Menu Overview Map” earlier in this manual to see the different paths if you have not already made yourselves familiar with the OSD Menu structure. Most functions are performed in real time so you do not have to exit the OSD menu to see the results.

Please note: Available functions described may deviate slightly from actual OSD menu on your product. This is due to different OSD software configurations and customized solutions.

Display / Picture / Brightness

Function only available in “Full” menu mode.
Increase/decrease the overall brightness of the panel electronically by controlling the voltage level. This applies to the Main Source signal. Window overlays (PIP/PBP) and the OSD Menu overlay will be unaffacted. This will be independent of the actual adjustment done by the front user controls like potmeters or buttons.

- Level adjusts from 0-100 steps. 50 is default.

Display / Picture / Contrast

Function only available in “Full” menu mode.
Increase/decrease the overall contrast of the panel electronically by controlling the voltage level. This applies to the Main Source signal. Window overlays (PIP/PBP) and the OSD Menu overlay will be unaffacted. This will be independent of the actual adjustment done by the front user controls like potmeters or buttons.

- Level adjusts from 0-100 steps. 50 is default.

Display / Picture / Phase

This function only apply for analog VGA/RGB signals.
Fine tune the data sampling position of the signal (impacts on image quality). This function will remove small transparent defects in typical characters where a portion seems to be more faint then the nearby black pixels. The faint pixels are always visible as a line from top to bottom (vertically).

- Level adjusts from 0-100 steps. Default is based on signal source.

Display / Picture / Frequency

This function only apply for analog VGA/RGB signals.
Adjust the horizontal frequency of the analog signal to improve visibility of the entire image. When it is adjusted, you will notice that the image will appear to be stretched and might in some situations start to flicker/scroll, at which point you must reverse the last adjustment to stop it from flickering/scrolling anymore. This function can be used for older signals that is not automatically detected by the internal display controller.

- Level adjusts from 0-200 steps. Default is based on signal source.

Display / Picture / Sharpness

Increase/decrease the overall image sharpness. This affects the whole panel, and applies to all signal inputs and window overlays (PIP/PBP). Use it to increase the visual quality of signals from possible older equipment or electronically weak signals.

- Level adjusts from 0-15 steps. 7 is default.

OSD Menu Functions

Display / Picture / Color

This function only apply for analog Composite/S-VHS video signals when set as Main Source.
Increase/decrease the overall video color saturation/color amount. Can be used if the incoming signal from older equipment or bad cables appear to have a lack of strong colors. Note that this function can also make noisy color signals appear crisper/clearer if adjusted to grayscales. Recommended is to use factory setting which is set to a neutral and a normalized level and use high quality cables.

- Level adjusts from 0-100 steps. 50 is default.

Display / Picture / Tint

This function only apply for analog Composite/S-VHS NTSC video signals when set as Main Source.
Increase/decrease the overall video tint. This will adjust all colors brighter or darker which makes the image more “washed out” or stronger in terms of color intensity. Can be used if the incoming signal from older equipment or bad cables appear to have a lack of strong colors. Recommended is to use factory setting which is set to a neutral and a normalized level.

- Level adjusts from 0-100 steps. 50 is default.

Display / Picture / Video System / **Auto** - DEFAULT

This function only apply for analog Composite/S-VHS video signals when set as Main Source.
Force automatic detection of video system format (factory default). Does not auto detect SECAM!

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Picture / Video System / NTSC

This function only apply for analog Composite/S-VHS video signals when set as Main Source.
Force the video system format to NTSC for all video inputs. If you feed the product with another video format expect flickering, missing colors or other visual deviations. If this happens either change to AUTO or change the video out settings on your external peripheral if possible.

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Picture / Video System / PAL

This function only apply for analog Composite/S-VHS video signals when set as Main Source.
Force the video system format to PAL for all video inputs. If you feed the product with another video format expect flickering, missing colors or other visual deviations. If this happens either change to AUTO or change the video out settings on your external peripheral if possible.

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Picture / Video System / SECAM

This function only apply for analog Composite/S-VHS video signals when set as Main Source.
Force the video system format to SECAM for all video inputs. If you feed the product with another video format expect flickering, missing colors or other visual deviations. If this happens either change to AUTO or change the video out settings on your external peripheral if possible.

- When selected, a box icon (■) will indicate that the selected function has been activated.

OSD Menu Functions

Display / Picture / PIP-PBP Adjustment / PIP Size

*To enable this function, please see **[Display / Source / xxx / xxx]** later in this section of the manual.*
Increase/decrease the Picture-In-Picture and Picture-By-Picture window sizes. These functions will allow any of the signal inputs to be placed as an real time window overlay (or side by side if using PBP) on top of the current Main Source signal enabling the main feature of the Maritime Multi Display functionality.

- Max PIP H size = 656 pixel
- Max PIP V size = Max PIP H size x Panel V resolution / Panel H resolution
- Min PIP H size = 256 pixel
- Min PIP V size = Min PIP H size x Panel V resolution / Panel H resolution
- 40 pixel each step.

Display / Picture / PIP-PBP Adjustment / H Position

*To enable this function, please see **[Display / Source / xxx / xxx]** later in this section of the manual.*
Move the horizontal (left/right) position of the real time window overlay.

- Level adjusts from 0-100 steps. 0 is default.

Display / Picture / PIP-PBP Adjustment / V Position

*To enable this function, please see **[Display / Source / xxx / xxx]** later in this section of the manual.*
Move the vertical (up/down) position of the real time window overlay.

- Level adjusts from 0-100 steps. 0 is default.

Display / Picture / PIP-PBP Adjustment / Alpha Blend

*To enable this function, please see **[Display / Source / xxx / xxx]** later in this section of the manual.*
Increase/decrease the alpha blend also known as transparency of the real time window overlay. It means that the Main Source signal will show through the PIP image. It is used when important information in the Main Source signal behind the window overlay is neccessary to be visible at all times.

- Level adjusts from 0-100 steps. 100 is default.

Display / Picture / PIP-PBP Adjustment / PIP Picture / Brightness

*To enable this function, please see **[Display / Source / xxx / xxx]** later in this section of the manual.*
Increase/decrease the overall brightness of the window overlay. This will not change the brightness of the Main Source signal behind the window overlay. It can be used for situations where the incoming video signal from CCTV or other video sources appear to dark in comparsion to the Main Source signal.

- Level adjusts from 0-100 steps. 50 is default.

Display / Picture / PIP-PBP Adjustment / PIP Picture / Contrast

*To enable this function, please see **[Display / Source / xxx / xxx]** later in this section of the manual.*
Increase/decrease the overall contrast of the window overlay. This will not change the contrast of the Main Source signal behind the window overlay. It can be used for situations where the incoming video signal from CCTV or other video sources appear to “washed out” in comparsion to the Main Source signal.

- Level adjusts from 0-100 steps. 50 is default.

OSD Menu Functions

Display / Picture / PIP-PBP Adjustment / PIP Picture / Sharpness

To enable this function, please see [Display / Source / xxx / xxx] later in this section of the manual.
Increase/decrease the overall image sharpness. This will not change the sharpness of the Main Source signal behind the window overlay. Use it to increase the visual quality of signals from possible older equipment or electronically weak signals.

- Level adjusts from 0-15 steps. 7 is default.

Display / Picture / PIP-PBP Adjustment / PIP Picture / Color

This function only apply for analog VIDEO IN signals.
*To enable this function, please see **[Display / Source / xxx / xxx]** later in this section of the manual.*
Increase/decrease the overall video color saturation/color amount. Can be used if the incoming signal from older equipment or bad cables appear to have a lack of strong colors. This will not change the color saturation/intensity of the Main Source signal behind the window overlay. Note that this function can also make noisy color signals appear crisper/clearer if adjusted to grayscales.

- Level adjusts from 0-100 steps. 50 is default.

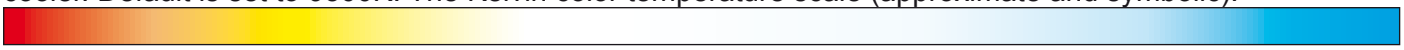
Display / Picture / PIP-PBP Adjustment / PIP Picture / Tint

This function only apply for analog VIDEO IN signals.
*To enable this function, please see **[Display / Source / xxx / xxx]** later in this section of the manual.*
Increase/decrease the overall video tint (applies only for NTSC video signals.). This will adjust all colors brighter or darker which makes the image more “washed out” or stronger in terms of color intensity. Can be used if the incoming signal from older equipment or bad cables appear to have a lack of strong colors. This will not change the color tint of the Main Source signal behind the window overlay.

- Level adjusts from 0-100 steps. 50 is default.

Display / Picture / Advanced Settings / Color Temperature / xx00K

Adjust the color temperature measured in Kelvin degrees. You can choose between 9300K, 8000K, 6500K and 5000K. This applies to the Main Source signal. Window overlays (PIP/PBP) and the OSD Menu overlay will be unaffacted. Lower values make the image appear warmer, while higher values will make it appear cooler. Default is set to 9300K. The Kelvin color temperature scale (approximate and symbolic):



- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Picture / Advanced Settings / Color Temperature / User / RGB

Function only available in “Full” menu mode.
Adjust the color temperature manually. You can adjust the R(red), G(green) and B(blue) levels. This applies to Main Source signal. The window overlays (PIP/PBP) and the OSD Menu overlay will be unaffected.

- Press the right (►) button to activate each R,G,B level and adjust them separately.

OSD Menu Functions

Display / Picture / Advanced Settings / Graphic Scaling / One to One

Function only available in "Full" menu mode & when analog DVI/VGA/RGB signal are set as Main Source.
Set the image scaling to 1:1. This means that the incoming signal is shown as is (with correct aspect ratio) and without any scaling to fit the display area. If the image appears to have black bars at top/bottom or/and left/right area, the external signal source is the cause of this. It does not support the signal in respect of what the native TFTs panel resolution requires.

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Picture / Advanced Settings / Graphic Scaling / Fill Screen

Function only available in "Full" menu mode & when analog DVI/VGA/RGB signal are set as Main Source.
Set the image scaling to fit the entire native TFT panel resolution. This means that the incoming signal is shown (without correct aspect ratio) and with scaling to fit the entire display area. The result is that the image will appear stretched. The external signal source is the cause of this. It does not support the signal in respect of what the native TFTs panel resolution requires.

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Picture / Advanced Settings / Graphic Scaling / Fill Aspect Ratio - DEFAULT

Function only available in "Full" menu mode & when analog DVI/VGA/RGB signal are set as Main Source.
Set the image scaling to fit the entire native TFTs panel resolution based on correct aspect ratio (factory default). This means that the incoming signal is scaled to best possible fit within the entire display area. The result is that black bars might be visible in top/bottom and/or left/right area. The external signal source is the cause of this. It does not support the signal in respect of what the native TFT panel resolution requires.

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Picture / Advanced Settings / Graphic Scaling / Anamorphic

Function only available in "Full" menu mode & when analog Comp/S-VHS signals are set as Main Source.
Will scale the widescreen image to fit a 4:3 or 5:4 native TFTs panel resolution. Anamorphic widescreen is a video technique that utilizes rectangular (wide) pixels to store a widescreen picture into standard 4:3 format. The result is that black bars will be visible in top/bottom area. The external signal source is the cause of this. It does not support the signal in respect of what the native TFT panel resolution requires. If the TFT panel is not of a widescreen type, this option must be selected to prevent the widescreen signal for being scaled in height and appear very stretched.

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Picture / Advanced Settings / Graphic Scaling / Auto

Function only available in "Full" menu mode & when analog Comp/S-VHS signals are set as Main Source.
The display controller will automatically try to identify the incoming signal and scale the image with respect of the aspect ratio and the TFTs native resolution to best possible fit the image on the entire display area. Since this is a automatic and electronically intelligent function it may not work correctly with all signal types. You may have to choose one of the other graphic scaling techniques above to get the correct/desired image apperance.

- When selected, a box icon (■) will indicate that the selected function has been activated.

OSD Menu Functions

Display / Picture / Advanced Settings / Horz Position

Move the horizontal (left/right) position of the entire display area. This applies to the Main Source signal. Please note that this function can move information in the image outside the visible display area, so use caution when modifying this parameter.

- Level adjusts from 0-100 steps. 50 is default.

Display / Picture / Advanced Settings / Vert Position

Move the vertical (up/down) position of the entire display area. This applies to the Main Source signal. Please note that this function can move information in the image outside the visible display area, so use caution when modifying this parameter.

- Level adjusts from 0-100 steps. 50 is default.

Display / Picture / Advanced Settings / Widescreen Mode

This will force the display controller to scale the image to match the incoming signal from typical radar systems with a custom resolution of 1360x1024. Since the display controller are unable to automatically detect the difference between this resolution and 1280x1024, the user have the option to manually set the display to the required resolution. Setting the resolution to 1280x1024 will only use the native TFTs panel resolution (for 19inch only). For other TFT sizes it will use the native TFT panel resolution instead (1:1).

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Picture / Advanced Settings / RGB Calibrate

Warning! The displayed image MUST be a black/white image (color/gray scale image not usable). If not, the calibration will produce wrong color values!

Function only available in "Full" menu mode and when analog VGA/RGB signal are set as Main Source.
This function will automatically calibrate the R(red), G(green), B(blue) signal gain values, also known as the color intensity to a neutral and a normalized level. This function will also override any previous color adjustments done by user in the OSD menu. It will also override the Kelvin color temperature setting and affects the Main Source signal.

- Press the right (►) button to activate. A confirmation requester will appear. Use **+/-** to confirm.

Display / Picture / Swap Source

*This function will be available if PIP/PBP is on, please see **[Display / Source / xxx / xxx]**.*
This function will swap the image in fullscreen and the window overlay. It will choose whatever signal inputs set in the **[Display / Source / xxx / xxx]** setting as Main Source and Second Source.

- Press the right (►) button to activate in real-time. The OSD menu will still be visible.

Display / Picture / Picture Info / Main Source

Please note that a valid input signal must be present for this function to work.
This function will show the picture information as detected by the display controller such as Physical Port Input Name, Current Signal Resolution, H-Freq. (horizontal frequency) and V-Freq. (vertical frequency). It will not perform any changes or adjustments to the display settings and signals.

- When selected, a box icon (■) will indicate that the selected function has been activated.

OSD Menu Functions

Display / Picture / Picture Info / Second Source

Please note that a valid input signal must be present for this function to work.
This function will show the picture information as detected by the display controller such as Physical Port Input Name, Current Signal Resolution, H-Freq. (horizontal frequency) and V-Freq. (vertical frequency). It will not perform any changes or adjustments to the display settings and signals.
● When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Picture / Auto Setup

Function only available when analog DVI/VGA/RGB signal are set as Main Source.
This function will try to re-negotiate with the current signal input and its specifications like frequency etc. to perform an auto-adjusting on screen to correct aspect ratio, centered on screen, re-negoiate phase/frequency (for analog signals). All signal inputs and image adjustments will be reset. It will not reset any configuration done for the OSD Menu overlay and various other user settings. This function can be used in cases where you suspect a faulty or unsuitable configuration of the unit is present. It can also be used in trouble-shooting situations to determine that the display are not or are the reason for a faulty or undesirable operation. The problem may be from external equipment.
● Press the right (►) button to activate. A confirmation requester will appear. Use **+/-** to confirm.

Display / Setup / OSD Settings / Language

This function will choose the default language to use in all OSD menu/text/messages for the entire display controller software. Available languages may be: English (default), Norwegian, Chinese (simplified), French, Spanish and Japanese. Please note that the manufacturer's user manual is currently only in English.
● When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Setup / OSD Settings / OSD Timeout (sec)

Increase/decrease the timeout period in seconds for the OSD Menu overlay to automatically disappear without the user having to manually exit from the OSD menu.
● Level adjusts from 5-30 seconds. 20 is default.

Display / Setup / OSD Settings / Transparency

Increase/decrease the alpha blend also known as transparency of the OSD Menu overlay. It means that all signals inputs and PIP/PBP images show through the OSD Menu. It is used when important information on the display is neccessary to be visible at all times. A black border around the OSD menu layout will always be black and is not affected by this adjustment.
● Level adjusts from 0-100 steps. 50 is default.

Display / Setup / OSD Settings / OSD Horz Position

Move the horizontal (left/right) position of the OSD Menu overlay. The OSD Menu can only be moved within the max display area available.
● Level adjusts from 0-100 steps. 50 is default.

OSD Menu Functions

Display / Setup / OSD Settings / OSD Vert Position

Move the vertical (left/right) position of the OSD Menu overlay. The OSD Menu can only be moved within the max display area available.

- Level adjusts from 0-100 steps. 50 is default.

Display / Setup / OSD Settings / Full Menu

Function only available through password protection.
If the current OSD Menu is in Simplified mode, you may gain access to all the functions again with the following procedure: Press the right (►) to activate the function, now a requester will appear with 3 digits shown as: 0 0 0.

To enable the OSD Menu to appear in Full Menu mode, please change the 3 digits to: 1 5 8 and press the right (►) to confirm. Now all the Menu functions will be accessible. When you power off the product, this setting will be reverted back to Simplified mode.

*Note: To force the OSD Menu to appear in Full Menu Mode always, you must first unlock the OSD Menu with the procedure as described and then go to the **[Display / Setup / OSD Settings / OSD Mode / Full]** and make sure that setting is activated, see below.*

Display / Setup / OSD Settings / OSD Mode / Simplified - May be set as factory default

Function only available in "Full" menu mode.
Force the OSD Menu to always appear in Simplified Mode (even after power shutdown of the unit). This means that a lot of advanced functions is not accessible from the OSD Menu. This is to prevent changes to the display that could impact on display functionality and image quality. Only experienced and qualified personnel should access and change this OSD Mode setting.

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Setup / OSD Settings / OSD Mode / Full - May be set as factory default

Function only available in "Full" menu mode.
Force the OSD Menu to always appear in Full Mode (even after power shutdown of the unit). This means that a lot of advanced functions is accessible from the OSD Menu. Only experienced and qualified personnel should access and change this OSD Mode setting. This is the factory default setting.

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Setup / User Settings / DPMS

Enable/disable the DPMS (VESA Display Power Management Signaling) function. DPMS is a standard from the VESA consortium for managing the power supply of display units for computers through the graphics card e.g; shut off the unit after the computer has been unused for some time (idle) to save power. Default is set to Enable (On).

- When selected, a box icon (■) will indicate that the selected function has been activated.

OSD Menu Functions

Display / Setup / User Settings / Auto Source Select

Enable/disable the automatic detection and selection of any signal input and show it full screen. If you have a external unit that switches between several other external signal inputs of different signal origins, this function will be helpful and switch to the signal that appears to be valid since the last detection was made. If for instance a Composite Video Signal was terminated, the display controller would automatically scan the other available signal inputs and show that signal full screen instead. If that too is lost, it will continue to scan the other signal inputs. If no signal inputs were in the end found to be valid, the unit would eventually only show a black image and automatically power off (standby) due to inactivity (idle) in the signal streams. Default is set to Disable (Off).

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Setup / User Settings / Filter - Only available in customized solutions.

Function only available in "Full" menu mode and when analog VGA/RGB signal are set as Main Source.
Enable/disable the ARGB filter (Analog RGB) which is a Signal Noise Reduction technique to enhance a possible weak or bad RGB/VGA signal. It will remove certain types of noise patterns typically apparent in close proximity of other electronic equipment with less or lack of proper shielding to prevent interference. Default is set to Disable (Off).

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Setup / User Settings / Communication / RS-232 - May be factory default.

Function only available in "Full" menu mode.
Configure the built-in HATTELAND® SCOM (Serial Remote Control Interface) to RS-232 protocol which enable software/remote control of a single HATTELAND® unit.

The SCOM will enable operators to modify a wide range of parameters available inside the display controller. Most of the functions described in this section is available, but also additional parameters can be inspected or adjusted with dedicated software connected to the unit's serial ports (COM). Daisy-chain operation is also possible by using a second COM port.

More in-depth information and usage about the SCOM, please visit: www.hatteland-display.com *"Product Support/Accessories/HATTELAND® SCOM Series 1)"* when made available.

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Setup / User Settings / Communication / 2-wire RS-485 - May be factory default.

Function only available in "Full" menu mode.
Configure the built-in HATTELAND® SCOM (Serial Remote Control Interface) to RS-485 protocol which enable software/remote control of one or several other HATTELAND® units simultaneously.

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Setup / User Settings / Communication / 4-wire RS-485/RS-422 - May be factory default.

Function only available in "Full" menu mode.
Configure the built-in HATTELAND® SCOM (Serial Remote Control Interface) to RS-485/RS-422 protocol which enable software/remote control of one or several other HATTELAND® units simultaneously.

- When selected, a box icon (■) will indicate that the selected function has been activated.

OSD Menu Functions

Display / Setup / User Settings / Communication / Address

Function only available in "Full" menu mode.
Configure the address which the current unit shall be identified as in a SCOM system. Whenever you communicate with the unit or units, the system will accept parameters or adjustments for that ID alone.
- Level adjust from 0-15 and reflects a unique ID number. Default is 0.

Display / Setup / User Settings / Gamma / x.x

Function only available in "Full" menu mode.
Adjust the overall gamma intensity. You can choose 1.0 (default), 1.6 or 2.0. Higher values will give a much more brighter/washed out picture even in the darkest areas, i.e. black becomes faint grey. This affects the whole panel, and all applies to all signal inputs and window overlays (PIP/PBP) inlcuding the OSD Menu overlay. This will be independent of the actual brightness/contrast adjustment done by the front user controls like potmeters or buttons.
- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Setup / User Settings / Splash Screen

Function only available in "Full" menu mode.
Enable/disable the Splash Screen logo upon power on for the unit and while the display controller is initalizing. It will be gone as soon as the signal input appear on screen. This is by factory default shown as manufacturer's brand logo (HATTELAND®). This can also be customized to show customer logo.

Display / Setup / Load Default / Factory Default

This function will reset everything to factory default settings. It will not revert back to a possible set of saved user defaults stored in the display controller software. All signal inputs and image adjustments will be reset. This function can be used in cases where you suspect a faulty or unsuitable configuration of the display is present. It can also be used in trouble-shooting situations to determine that the display are not or are the reason for a faulty or undesirable operation. The problem may be from external equipment.
- Press the right (►) button to activate. A confirmation requester will appear. Use **+/-** to confirm.

Display / Setup / Load Default / DDC Setup

Function only available in "Full" menu mode.
This function will detect the TFT panel specifications and update the DDC (Display Data Configuration) for the display controller. It is to make sure the TFT panel's specifications can be detected succesfully by the display controller software. This can be used in trouble-shooting situations to determine that the display are not or are the reason for a faulty or undesirable operation. The problem may be from external equipment.
- Press the right (►) button to activate. A confirmation requester will appear. Use **+/-** to confirm.

OSD Menu Functions

Display / Setup / Load Default / Load User Default

This function will restore any User Default settings that have been saved previously. If no User Defaults was found, nothing will be re-configured. The User Defaults consists of custom settings and all parameters adjusted in the entire OSD Menu by user. This can be used in trouble-shooting situations to determine that the display are not or are the reason for a faulty or undesirable operation. The problem may be from external equipment.

- Press the right (►) button to activate. A confirmation requester will appear. Use **+/-** to confirm.

Display / Setup / Load Default / Save User Default

Function only available in "Full" menu mode.

This function will create and save a own custom User Default based on what settings and parameters the user has edited in the OSD Menu. It will never save over the Factory Default, and it completely independent. This can also be useful for customers who want to specifically preset the OSD Menu after a certain company or usage/operation policy.

- Press the right (►) button to activate. A confirmation requester will appear. Use **+/-** to confirm.

Display / Setup / Direct Access / xxx

This function will configure the hot-key functionality. It means that the user can access a function that is normally only accessible by browing through the OSD Menu and locate the function. It is assigned to the MENU button on the physical user controls normally located on the front bezel.

Available assigned functions are: **Brightness, PIP Size, Main Source, Second Source, Alpha Blend, Video Scaling, Swap Source, Test Pattern, No Function.**

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Setup / Test Pattern

This function will show a typical test pattern with greyscales, colors and raster patterned boxes to check for deviations in the TFT panel/display controller behaviour. It is independent of any current resolution or specifications found in the signal inputs. The test pattern is generated internally in the display controller and is sent 1:1 directly to the TFT panel. It can be therefore be used in trouble-shooting situations to determine that the display are not or are the reason for a faulty or undesirable operation. The problem may be from external equipment. Also, this function will be handy to check the display quality without having any signal input available to test with.

- Press the right (►) button to activate the function, and press any other button to exit the test pattern.

Display / Setup / Service Menu / Type and Serial

Function only available in "Full" menu mode.

This function will show the unit's Type Number and Serial Number. This information is stored electronically on a board chip component. Example: "JH 23T12 MMD-AA1-AAAA-000001"

OSD Menu Functions

Display / Setup / Service Menu / EVX Firmware Ver

Function only available in "Full" menu mode.
This function will show the firmware version (software OSD) of the display controller. This information is stored electronically on the EVX component board.
Example: "E0.30.00 1".

Display / Setup / Service Menu / ECOM Firmware Ver

Function only available in "Full" menu mode.
This will show the firmware version on the internal micro controller. This information is stored electronially on a board chip component. Example: "SW100062-1E5".

Display / Setup / Service Menu / Elapsed Time (hr)

Function only available in "Full" menu mode.
This function will show the current elapsed running time for the unit in hours. It is based on that the display has actually shown a valid image on screen during that time and not just how long the product has been powered on. It can be used to determine the life span in respect of what the MTBF for the display or backlight is specified to. This information is stored electronically on the EVX component board.
Example: "452"

Display / Setup / Service Menu / Fault Status

Function only available in "Full" menu mode.
This function will show the last recorded fault message detected by the display controller. This information is stored electronically on the EVX component board. Example: "Video Chip, DVI Chip, NVRAM, DDC"

Display / Source / Single / xxx

This function will indicate what physical signal inputs is considered to be detectable by the OSD Menu and the display controller. The amount of signal inputs available will depend on the physical HATTELAND® IO Cable you have installed in the system. You can choose what sources are to be detectable and a icon next to each source will indicate its activity. When you for instance use the Swap Source function it will swap between all the indicated ones. Possible sources might include: **Analog RGB 1, Analog RGB 2, Digital (DVI), S-Video 1, S-Video 2, S-Video 3, Composite 1, Composite 2 and Composite 3.**

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Source / PIP / xxx

This function will indicate what physical signal inputs is considered to be detectable by the OSD Menu, the display controller and what is visible in the window overlay (Picture-In-Picture). The amount of signal inputs available will depend on the physical HATTELAND® Multifunction Cable you have connected to the unit. You can choose what sources are to be detectable and a icon next to each source will indicate its activity. When you for instance use the Swap Source/PIP function it will swap between all the indicated ones. Possible sources might include: **Analog RGB 1, Analog RGB 2, Digital (DVI), S-Video 1, S-Video 2, S-Video 3, Composite 1, Composite 2 and Composite 3.**
Note: This function is by factory default set to auto detect the signal source automatically. It means if you have **Composite 1** and **Composite 2** set as sources and you loose signal on Composite 1, the function will automatically switch to the next signal detectable, which in this example is **Composite 2**. If no signals are detectable the image will be black.

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Source / PBP / xxx

This function will indicate what physical signal inputs is considered to be detectable by the OSD Menu, the display controller and what is visible in the window overlay (Picture-By-Picture). The amount of signal inputs available will depend on the physical HATTELAND® Multifunction Cable you have connected to the unit. You can choose what sources are to be detectable and a icon next to each source will indicate its activity. When you for instance use the Swap Source/PBP function it will show two window overlays at the same time next to eachother. Possible sources might include: **Analog RGB 1, Analog RGB 2, Digital (DVI), S-Video 1, S-Video 2, S-Video 3, Composite 1, Composite 2 and Composite 3.**
Note: This function is by factory default set to auto detect the signal source automatically. It means if you have **Composite 1** and **Composite 2** set as sources and you loose signal on Composite 1, the function will automatically switch to the next signal detectable, which in this example is **Composite 2**. If no signals are detectable the image will be black.

- When selected, a box icon (■) will indicate that the selected function has been activated.

Display / Power Off

This function will turn off the unit (soft power off) and shut down the display controller and cut internal power to all components except the power module. The LED indicator ring/power leds will all illuminate red. The unit will enter standby mode. It does the same function as pressing the power button located on the user controls/front bezel. Please note that the power will still be present inside the unit because of the power cable is still physically connected to the power module.

- Press the right (►) button to activate. A confirmation requester will appear. Use **+/-** to confirm.

Specifications

Specifications - JH 15T15 MMD-xxx-Axxx

Note: All specifications are subject to change without prior notice!

TFT Technology:

- High Quality SHARP TFT
- 15.0 inch viewable image size
- Color Active Matrix LCD Module
- a-Si Thin Film Transistor (TFT)

TFT Characteristics:

- Pixel Number : 1024 x 768
- Pixel Pitch (RGB) : 0.297 (H) x 0.297 (V) mm
- Response Time : 25 ms (typical), "black" to "white"
- Contrast Ratio : 400:1 (typical)
- Light Intensity : 250 cd/m2 (typical)
- Viewable Angle : +/- 85 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 304.1 (H) x 228.1 (V) mm
- Max Colors : 16.7 millions

Synchronisation:

Sync Signal:
- Digital separate synchronisation
- Composite synchronisation
- Synchronisation on green.
- Auto detects VGA -> UXGA, interlaced and non interlaced
- Video Signal : Analog RGB 0,7Vp-p
  : Input Impedance 75 Ohm

Synchronisation Range:
- Horizontal : 15,0 kHz to 91,1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimum picture quality*

Supported Signals:

Resolutions:
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768*
- SXGA : 1280 x 1024
- UXGA : 1600 x 1200

** Recommended for optimum picture quality. (60 Hz only)*

Video Signals:
- Interlaced NTSC and PAL/SECAM video
- Composite video

Power Specifications:

Power Supply:
- 115& 230VAC - 50 / 60Hz - JH 15T15 MMD-Axx-xxxx
- 24 VDC - JH 15T15 MMD-Dxx-xxxx

Power Consumption:
Operating : 100 W (max)

Typical Type Numbers:

- JH 15T15 MMD-AA1-AAAA = Standard AC, Keypad controls only
- JH 15T15 MMD-DA1-AAAC = Standard DC & Capacitive Touch Screen

- For a full overview, please review our typenumber sheet found on our website:
http://www.hatteland-display.com/pdf/misc/ind100780-1_series1redesign_typenumber_desc.pdf

Physical Considerations:

- 412 (W) x 345 (H) x 73 (D) mm / 16.22" (W) x 13.58" (H) x 2.87" (D)
- Weight: 7 kg (approx)

Signal Terminals:

- DVI-I Signal IN : 1 x 29p DVI Female (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15p HD D-SUB (female)
- RGB Signal OUT : 1 x 15p HD D-SUB (female) - Clone of RGB IN**
- Multifunction : 1 x 160p D-SUB (female) - Also see table below
- USB I/O : 1 x TYPE B Conn. (female) Reserved for future use
- AC Power IN : 1 x Std IEC Inlet
- AC Power OUT : 1 x Std IEC Outlet
- DC Power IN : 1 x 2p D-SUB Connector (male) - Amphenol FCC17

**Tested at recommended resolutions. The RGB output signal is at same resolution and sync as the RGB input. The output is working even if the display unit is turned off, but power cable/supply must be connected/provided.

HATTELAND® Multifunction Cable:

The factory standard cable is delivered with the following connectors.
2 Standard cables are defined. Standard cable length is 30cm.

#1	• COM1	: 1 x 9p D-SUB (female) - RS232
	• Composite Video IN	: 3 x BNC (female)
#2	• COM1	: 1 x 9p D-SUB (female) - RS232
	• Composite Video IN	: 3 x BNC (female)
	• COM Touch	: 1 x 9p D-SUB (female) - For touch screen

Customized cables are possible to support more built-in signals, like: RS-232, RS-485, RS-422/RS-485, Buzzer, ON/OFF, Touch (RS-232 or PS/2), 1 x S-Video IN, 3 x Composite Video IN, Remote External User Controls, Alternative Keypad interface (i2c) and reserved for other signals. Custom cable lengths can be manufactured.

User Controls:

On front bezel - Keypad control (IP66) xxx-xxAx models:
- Power On/Off and On Screen Display Menu (push button)
- Brightness Control (up/down - push buttons)
- Hotkeys (left/right - push buttons)
- Mode Status Red/Green Illuminated LED-Ring Indicator

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
  - Humidity up to 95%
- Storage : Temperature -20 deg. C to +60 deg. C
  - Humidity up to 95%
- IP Rating : EN60529 (IP66) (Applies for flush mount)
- Compass Safe Dist. : JH15T15MMD-xxx-xxxx - Std: TBD Steering: TBD

Safety Considerations:
Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Available Accessories:

- Cables = Custom Multifunction Cable to support more signals
- JH 15TBR STD-A1 = Bracket (Review bracket datasheet/user manual)
- JH XXTRO STD-A1= Rotary Bracket (Review bracket datasheet/manual)
- JH 15TSV STD-A1 = Sun Visor (Review user manual)
- JH VESA 15T03-A1= Vesa Bracket (Review user manual)
- JH 15TAP STD-A1 = 15" Adapter Frame to 19" Rack (Review user manual)
- JH 15TAP STD-B1 = 15" Adapter Frame to 17" CRT monitor (Review man)
- JH 15TWC STD-A1= Water Cover (Review user manual)

Factory Options:

- Resistive* or Capacitive Touch Screen / Optical Technology Bonding*

**Note that all 15 inch with resistive touch screens can not be combined with bonding.*

TESTING / APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th)
DNV - Det Norske Veritas
BV - Bureau Veritas
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
GL - Germanischer Lloyd
LRS - Lloyd's Register of Shipping (pending)

Specifications - JH 15T17 MMD-xxx-Axxx

Note: All specifications are subject to change without prior notice!

TFT Technology:

- High Quality SHARP TFT
- 15.0 inch viewable image size
- Color Active Matrix LCD Module
- a-Si Thin Film Transistor (TFT)

TFT Characteristics:

- Pixel Number : 1024 x 768
- Pixel Pitch (RGB) : 0.297 (H) x 0.297 (V) mm
- Response Time : 25 ms (typical), "black" to "white"
- Contrast Ratio : 400:1 (typical)
- Light Intensity : 250 cd/m2 (typical)
- Viewable Angle : +/- 85 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 304.1 (H) x 228.1 (V) mm
- Max Colors : 16.7 millions

Synchronisation:

Sync Signal:
- Digital separate synchronisation
- Composite synchronisation
- Synchronisation on green.
- Auto detects VGA -> UXGA, interlaced and non interlaced
- Video Signal : Analog RGB 0,7Vp-p
  : Input Impedance 75 Ohm

Synchronisation Range:
- Horizontal : 15,0 kHz to 91,1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimum picture quality*

Supported Signals:

Resolutions:
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768*
- SXGA : 1280 x 1024
- UXGA : 1600 x 1200

** Recommended for optimum picture quality. (60 Hz only)*

Video Signals:
- Interlaced NTSC and PAL/SECAM video
- Composite video

Power Specifications:

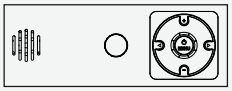
Power Supply:
- 115& 230VAC - 50 / 60Hz - JH 15T17 MMD-Axx-xxxx
- 24 VDC - JH 15T17 MMD-Dxx-xxxx

Power Consumption:
Operating : 100 W (max)

Typical Type Numbers:

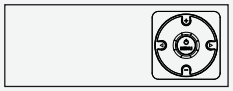
- JH 15T17 MMD-AA1-AAAA = Standard AC, Keypad controls only
- JH 15T17 MMD-DA1-AAAC = Standard DC & Capacitive Touch Screen
- JH 15T17 MMD-AA1-AOBA = Standard AC, Bonded, Potmeter Controls, Buzzer

Buzzer-Potmeter-Keypad



MMD-xxx-xxBx

Keypad



MMD-xxx-xxAx

- For a full overview, please review our typenumber sheet found on our website:
http://www.hatteland-display.com/pdf/misc/ind100780-1_series1redesign_typenumber_desc.pdf

Physical Considerations:

- 412 (W) x 345 (H) x 73 (D) mm / 16.22" (W) x 13.58" (H) x 2.87" (D)
- Weight: 7 kg (approx)

Signal Terminals:

- DVI-I Signal IN : 1 x 29p DVI Female (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15p HD D-SUB (female)
- RGB Signal OUT : 1 x 15p HD D-SUB (female) - Clone of RGB IN**
- Multifunction : 1 x 160p D-SUB (female) - Also see table below
- USB I/O : 1 x TYPE B Conn. (female) Reserved for future use
- AC Power IN : 1 x Std IEC Inlet
- AC Power OUT : 1 x Std IEC Outlet
- DC Power IN : 1 x 2p D-SUB Connector (male) - Amphenol FCC17

**Tested at recommended resolutions. The RGB output signal is at same resolution and sync as the RGB input. The output is working even if the display unit is turned off, but power cable/supply must be connected/provided.

HATTELAND® Multifunction Cable:

The factory standard cable is delivered with the following connectors.
2 Standard cables are defined. Standard cable length is 30cm.

#1	• COM1	: 1 x 9p D-SUB (female) - RS232
	• Composite Video IN	: 3 x BNC (female)

#2	• COM1	: 1 x 9p D-SUB (female) - RS232
	• Composite Video IN	: 3 x BNC (female)
	• COM Touch	: 1 x 9p D-SUB (female) - For touch screen

Customized cables are possible to support more built-in signals, like: RS-232, RS-485, RS-422/RS-485, Buzzer, ON/OFF, Touch (RS-232 or PS/2), 1 x S-Video IN, 3 x Composite Video IN, Remote External User Controls, Alternative Keypad interface (i2c) and reserved for other signals. Custom cable lengths can be manufactured.

User Controls:

On front bezel - Keypad control (IP66) xxx-xxAx models:
- Power On/Off and On Screen Display Menu (push button)
- Brightness Control (up/down - push buttons)
- Hotkeys (left/right - push buttons)
- Mode Status Red/Green Illuminated LED-Ring Indicator

On front bezel - Potmeter control (IP66) xxx-xxBx models:
- Power On/Off and On Screen Display Menu (push button)
- Brightness Control (rotary control)
- Hotkeys (left/right - push buttons)
- Mode Status Red/Green Illuminated LED-Ring Indicator
- Speaker / Buzzer

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
  - Humidity up to 95%
- Storage : Temperature -20 deg. C to +60 deg. C
  - Humidity up to 95%
- IP Rating : EN60529 (IP66) (Applies for flush mount)
- Compass Safe Dist. : JH15T17MMD-xxx-xxxx - Std: TBD Steering: TBD

Safety Considerations:
Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Available Accessories:

- Cables = Custom Multifunction Cable to support more signals
- JH 15TBR STD-A1 = Bracket (Review bracket datasheet/user manual)
- JH XXTRO STD-A1= Rotary Bracket (Review bracket datasheet/manual)
- JH 15TSV STD-A1 = Sun Visor (Review user manual)
- JH VESA 15T03-A1= Vesa Bracket (Review user manual)
- JH 15TAP STD-A1 = 15" Adapter Frame to 19" Rack (Review user manual)
- JH 15TAP STD-B1 = 15" Adapter Frame to 17" CRT monitor (Review man)
- JH 15TWC STD-A1= Water Cover (Review user manual)

Factory Options:

- Resistive* or Capacitive Touch Screen / Optical Technology Bonding*

**Note that all 15 inch with resistive touch screens can not be combined with bonding.*

TESTING / APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th) (pending)
DNV - Det Norske Veritas (pending)
BV - Bureau Veritas (pending)
ClassNK - Nippon Kaiji Kyokai (pending)
ABS - American Bureau of Shipping (pending)
GL - Germanischer Lloyd (pending)
LRS - Lloyd's Register of Shipping (pending)

Specifications - JH 19T12 MMD-xxx-Axxx

Note: All specifications are subject to change without prior notice!

TFT Technology:

- High Quality SHARP TFT
- 19.0 inch viewable image size
- Active Matrix, Thin Film Transistor (TFT)
- MVA Premium™ Technology

TFT Characteristics:

- Pixel Number : 1280 x 1024
- Pixel Pitch (RGB) : 0.294 (H) x 0.294 (V) mm
- Response Time : 15 ms (typical), "black" to "white"
- Contrast Ratio : 700:1 (typical)
- Light Intensity : 300 cd/m2 (typical)
- Viewable Angle : +/- 85 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 376.32 (H) x 301.056 (V) mm
- Max Colors : 16.7 millions

Synchronisation:

Sync Signal:
- Digital separate synchronisation
- Composite synchronisation
- Synchronisation on green.
- Auto detects VGA -> SXGA, interlaced and non interlaced
- Video Signal : Analog RGB 0,7Vp-p
  : Input Impedance 75 Ohm

Synchronisation Range:
- Horizontal : 15,0 kHz to 91,1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimum picture quality*

Supported Signals:

Resolutions:
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768
- SXGA : 1280 x 1024*

** Recommended for optimum picture quality. (60 Hz only)*

Video Signals:
- Interlaced NTSC and PAL/SECAM video
- Composite video

Power Specifications:

Power Supply:
- 115& 230VAC - 50 / 60Hz - JH 19T12 MMD-Axx-xxxx
- 24 VDC - JH 19T12 MMD-Dxx-xxxx

Power Consumption:
Operating : 100 W (max)

Typical Type Numbers:

- JH 19T12 MMD-AA1-AAAA = Standard AC, Keypad controls only
- JH 19T12 MMD-DA1-AAAC = Standard DC & Capacitive Touch Screen

- For a full overview, please review our typenumber sheet found on our website:
http://www.hatteland-display.com/pdf/misc/ind100780-1_series1redesign_typenumber_desc.pdf

Physical Considerations:

- 483 (W) x 444 (H) x 82 (D) mm / 19.02" (W) x 17.48" (H) x 3.23" (D)
- Weight: 11.50 kg (approx)

Signal Terminals:

- DVI-I Signal IN : 1 x 29p DVI Female (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15p HD D-SUB (female)
- RGB Signal OUT : 1 x 15p HD D-SUB (female) - Clone of RGB IN**
- Multifunction : 1 x 160p D-SUB (female) - Also see table below
- USB I/O : 1 x TYPE B Conn. (female) Reserved for future use
- AC Power IN : 1 x Std IEC Inlet
- AC Power OUT : 1 x Std IEC Outlet
- DC Power IN : 1 x 2p D-SUB Connector (male) - Amphenol FCC17

**Tested at recommended resolutions. The RGB output signal is at same resolution and sync as the RGB input. The output is working even if the display unit is turned off, but power cable/supply must be connected/provided.

HATTELAND® Multifunction Cable:

The factory standard cable is delivered with the following connectors.
2 Standard cables are defined. Standard cable length is 30cm.

#1	• COM1	: 1 x 9p D-SUB (female) - RS232
	• Composite Video IN	: 3 x BNC (female)
#2	• COM1	: 1 x 9p D-SUB (female) - RS232
	• Composite Video IN	: 3 x BNC (female)
	• COM Touch	: 1 x 9p D-SUB (female) - For touch screen

Customized cables are possible to support more built-in signals, like: RS-232, RS-485, RS-422/RS-485, Buzzer, ON/OFF, Touch (RS-232 or PS/2), 1 x S-Video IN, 3 x Composite Video IN, Remote External User Controls, Alternative Keypad interface (i2c) and reserved for other signals. Custom cable lengths can be manufactured.

User Controls:

On front bezel - Keypad control (IP66) xxx-xxAx models:
- Power On/Off and On Screen Display Menu (push button)
- Brightness Control (up/down - push buttons)
- Hotkeys (left/right - push buttons)
- Mode Status Red/Green Illuminated LED-Ring Indicator

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
  - Humidity up to 95%
- Storage : Temperature -20 deg. C to +60 deg. C
  - Humidity up to 95%
- IP Rating : EN60529 (IP66) (Applies for flush mount)
- Compass Safe Dist. : JH19T12MMD-xxx-xxxx - Std: 1.60m Steering: 1.05m

Safety Considerations:
Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Available Accessories:

- Cables = Custom Multifunction Cable to support more signals
- JH MMD BR = Bracket (Review bracket datasheet/user manual)
- JH MMDROSTD-A1= Rotary Bracket (Review bracket datasheet/manual)
- JH 19TSV STD-A1 = Sun Visor (Review user manual)
- JH VESA 18T04 = Vesa Bracket (Review user manual)
- JH 19TAP STD-A1 = 19" to 21" CRT Adapter frame (Review user manual)
- JH 19TWC STD-B1= Water Cover (Review user manual)

Factory Options:

- Resistive* or Capacitive Touch Screen / Optical Technology Bonding*

**Note that all 19 inch with resistive touch screens can not be combined with bonding.*

TESTING/APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th)
DNV - Det Norske Veritas
BV - Bureau Veritas
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
GL - Germanischer Lloyd
LRS - Lloyd's Register of Shipping (pending)

Specifications - JH 19T14 MMD-xxx-Axxx

Note: All specifications are subject to change without prior notice!

TFT Technology:

- High Quality SHARP TFT
- 19.0 inch viewable image size
- Active Matrix, Thin Film Transistor (TFT)
- MVA Premium™ Technology

TFT Characteristics:

• Pixel Number	: 1280 x 1024
• Pixel Pitch (RGB)	: 0.294 (H) x 0.294 (V) mm
• Response Time	: 12 ms (typical), "black" to "white"
• Contrast Ratio	: 900:1 (typical)
• Light Intensity	: 300 cd/m2 (typical)
• Viewable Angle	: +/- 85 deg. (typical) (Up/Down/Left/Right)
• Active Display Area	: 376.32 (H) x 301.056 (V) mm
• Max Colors	: 16.7 millions

Synchronisation:

Sync Signal:
- Digital separate synchronisation
- Composite synchronisation
- Synchronisation on green.
- Auto detects VGA -> SXGA, interlaced and non interlaced
- Video Signal : Analog RGB 0,7Vp-p
  : Input Impedance 75 Ohm

Synchronisation Range:
- Horizontal : 15,0 kHz to 91,1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimum picture quality*

Supported Signals:

Resolutions:
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768
- SXGA : 1280 x 1024*

** Recommended for optimum picture quality. (60 Hz only)*

Video Signals:
- Interlaced NTSC and PAL/SECAM video
- Composite video

Power Specifications:

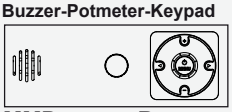
Power Supply:
- 115& 230VAC - 50 / 60Hz - JH 19T14 MMD-Axx-xxxx
- 24 VDC - JH 19T14 MMD-Dxx-xxxx

Power Consumption:
Operating : 100 W (max)

Typical Type Numbers:

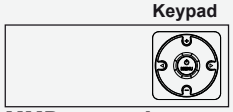
- JH 19T14 MMD-AA1-AAAA = Standard AC, Keypad controls only
- JH 19T14 MMD-DA1-AAAC = Standard DC & Capacitive Touch Screen
- JH 19T14 MMD-AA1-AOBA = Standard AC, Bonded, Potmeter Controls, Buzzer

Buzzer-Potmeter-Keypad



MMD-xxx-xxBx

Keypad



MMD-xxx-xxAx

For a full overview, please review our typenumber sheet found on our website:
http://www.hatteland-display.com/pdf/misc/ind100780-1_series1redesign_typenumber_desc.pdf

Physical Considerations:

- 483 (W) x 444 (H) x 82 (D) mm / 19.02" (W) x 17.48" (H) x 3.23" (D)
- Weight: 11.50 kg (approx)

Signal Terminals:

• DVI-I Signal IN	: 1 x 29p DVI Female (or as RGB IN with adapter)
• RGB Signal IN	: 1 x 15p HD D-SUB (female)
• RGB Signal OUT	: 1 x 15p HD D-SUB (female) - Clone of RGB IN**
• Multifunction	: 1 x 160p D-SUB (female) - Also see table below
• USB I/O	: 1 x TYPE B Conn. (female) Reserved for future use
• AC Power IN	: 1 x Std IEC Inlet
• AC Power OUT	: 1 x Std IEC Outlet
• DC Power IN	: 1 x 2p D-SUB Connector (male) - Amphenol FCC17

**Tested at recommended resolutions. The RGB output signal is at same resolution and sync as the RGB input. The output is working even if the display unit is turned off, but power cable/supply must be connected/provided.

HATTELAND® Multifunction Cable:

The factory standard cable is delivered with the following connectors.
2 Standard cables are defined. Standard cable length is 30cm.

#1	• COM1	: 1 x 9p D-SUB (female) - RS232
	• Composite Video IN	: 3 x BNC (female)

#2	• COM1	: 1 x 9p D-SUB (female) - RS232
	• Composite Video IN	: 3 x BNC (female)
	• COM Touch	: 1 x 9p D-SUB (female) - For touch screen

Customized cables are possible to support more built-in signals, like: RS-232, RS-485, RS-422/RS-485, Buzzer, ON/OFF, Touch (RS-232 or PS/2), 1 x S-Video IN, 3 x Composite Video IN, Remote External User Controls, Alternative Keypad interface (i2c) and reserved for other signals. Custom cable lengths can be manufactured.

User Controls:

On front bezel - Keypad control (IP66) xxx-xxAx models:
- Power On/Off and On Screen Display Menu (push button)
- Brightness Control (up/down - push buttons)
- Hotkeys (left/right - push buttons)
- Mode Status Red/Green Illuminated LED-Ring Indicator

On front bezel - Potmeter control (IP66) xxx-xxBx models:
- Power On/Off and On Screen Display Menu (push button)
- Brightness Control (rotary control)
- Hotkeys (left/right - push buttons)
- Mode Status Red/Green Illuminated LED-Ring Indicator
- Speaker / Buzzer

Environmental Considerations:

• Operating	: Temperature -15 deg. C to +55 deg. C - Humidity up to 95%
• Storage	: Temperature -20 deg. C to +60 deg. C - Humidity up to 95%
• IP Rating	: EN60529 (IP66) (Applies for flush mount)
• Compass Safe Dist.	: JH19T14MMD-xxx-xxxx - Std: 1.60m Steering: 1.05m

Safety Considerations:
Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Available Accessories:

- Cables = Custom Multifunction Cable to support more signals
- JH MMD BR = Bracket (Review bracket datasheet/user manual)
- JH MMDROSTD-A1= Rotary Bracket (Review bracket datasheet/manual)
- JH 19TSV STD-A1 = Sun Visor (Review user manual)
- JH VESA 18T04 = Vesa Bracket (Review user manual)
- JH 19TAP STD-A1 = 19" to 21" CRT Adapter frame (Review user manual)
- JH 19TWC STD-B1= Water Cover (Review user manual)

Factory Options:

- Resistive* or Capacitive Touch Screen / Optical Technology Bonding*

**Note that all 19 inch with resistive touch screens can not be combined with bonding.*

TESTING/APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th) (pending)
DNV - Det Norske Veritas (pending)
BV - Bureau Veritas (pending)
ClassNK - Nippon Kaiji Kyokai (pending)
ABS - American Bureau of Shipping (pending)
GL - Germanischer Lloyd (pending)
LRS - Lloyd's Register of Shipping (pending)

Specifications - JH 20T17 MMD-xxx-Axxx

Note: All specifications are subject to change without prior notice!

TFT Technology:

- High Quality SHARP TFT
- 20.1 inch viewable image size
- a-Si TFT (Thin Film Transistor) Active Matrix

TFT Characteristics:

- Pixel Number : 1600 x 1200
- Pixel Pitch (RGB) : 0.255 (H) x 0.255 (V) mm
- Response Time : 20 ms (typical), rise + fall
- Contrast Ratio : 700:1 (typical)
- Light Intensity : 300 cd/m2 (typical)
- Viewable Angle : +/- 85 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 408.0 (H) x 306.0 (V) mm
- Max Colors : 16.7 millions

Synchronisation:

Sync Signal:
- Digital separate synchronisation
- Composite synchronisation
- Synchronisation on green.
- Auto detects VGA -> SXGA, interlaced and non interlaced
- Video Signal : Analog RGB 0,7Vp-p
  : Input Impedance 75 Ohm

Synchronisation Range:
- Horizontal : 15,0 kHz to 91,1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimum picture quality*

Supported Signals:

Resolutions:
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768
- SXGA : 1280 x 1024
- UXGA : 1600 x 1200*

** Recommended for optimum picture quality. (60 Hz only)*

Video Signals:
- Interlaced NTSC and PAL/SECAM video
- Composite video

Power Specifications:

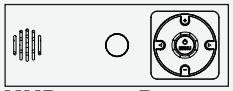
Power Supply:
- 115& 230VAC - 50 / 60Hz - JH 20T17 MMD-Axx-xxxx
- 24 VDC - JH 20T17 MMD-Dxx-xxxx

Power Consumption:
Operating : 100 W (max)

Typical Type Numbers:

- JH 20T17 MMD-AA1-AAAA = Standard AC, Keypad controls only
- JH 20T17 MMD-DA1-AAAC = Standard DC & Capacitive Touch Screen
- JH 20T17 MMD-AA1-AOBA = Standard AC, Bonded, Potmeter Controls, Buzzer

Buzzer-Potmeter-Keypad



MMD-xxx-xxBx

Keypad

MMD-xxx-xxAx

For a full overview, please review our typenumber sheet found on our website:
http://www.hatteland-display.com/pdf/misc/ind100780-1_series1redesign_typenumber_desc.pdf

Physical Considerations:

- 534 (W) x 481 (H) x 87 (D) mm - 21.02" (W) x 18.93" (H) x 3.42" (D)
- Weight: 13.50 kg (approx)

Signal Terminals:

- DVI-I Signal IN : 1 x 29p DVI Female (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15p HD D-SUB (female)
- RGB Signal OUT : 1 x 15p HD D-SUB (female) - Clone of RGB IN**
- Multifunction : 1 x 160p D-SUB (female) - Also see table below
- USB I/O : 1 x TYPE B Conn. (female) Reserved for future use
- AC Power IN : 1 x Std IEC Inlet
- AC Power OUT : 1 x Std IEC Outlet
- DC Power IN : 1 x 2p D-SUB Connector (male) - Amphenol FCC17

**Tested at recommended resolutions. The RGB output signal is at same resolution and sync as the RGB input. The output is working even if the display unit is turned off, but power cable/supply must be connected/provided.

HATTELAND® Multifunction Cable:

The factory standard cable is delivered with the following connectors.
2 Standard cables are defined. Standard cable length is 30cm.

#1	• COM1	: 1 x 9p D-SUB (female) - RS232
	• Composite Video IN	: 3 x BNC (female)
#2	• COM1	: 1 x 9p D-SUB (female) - RS232
	• Composite Video IN	: 3 x BNC (female)
	• COM Touch	: 1 x 9p D-SUB (female) - For touch screen

Customized cables are possible to support more built-in signals, like: RS-232, RS-485, RS-422/RS-485, Buzzer, ON/OFF, Touch (RS-232 or PS/2), 1 x S-Video IN, 3 x Composite Video IN, Remote External User Controls, Alternative Keypad interface (i2c) and reserved for other signals. Custom cable lengths can be manufactured.

User Controls:

On front bezel - Keypad control (IP66) xxx-xxAx models:
- Power On/Off and On Screen Display Menu (push button)
- Brightness Control (up/down - push buttons)
- Hotkeys (left/right - push buttons)
- Mode Status Red/Green Illuminated LED-Ring Indicator

On front bezel - Potmeter control (IP66) xxx-xxBx models:
- Power On/Off and On Screen Display Menu (push button)
- Brightness Control (rotary control)
- Hotkeys (left/right - push buttons)
- Mode Status Red/Green Illuminated LED-Ring Indicator
- Speaker / Buzzer

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
  - Humidity up to 95%
- Storage : Temperature -20 deg. C to +60 deg. C
  - Humidity up to 95%
- IP Rating : EN60529 (IP66) (Applies for flush mount)
- Compass Safe Dist. : JH20T17MMD-xxx-xxxx - Std: n/a Steering: n/a

Safety Considerations:
Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Available Accessories:

- Cables = Custom Multifunction Cable to support more signals
- JH MMDBRSTD-A1= Bracket (Review bracket datasheet/user manual)
- JH MMDROSTD-A1= Rotary Bracket (Review bracket datasheet/manual)
- JH 20TSVSTD-B1 = Sun Visor (Review user manual)
- JH VESA20T06-A1 = Vesa Bracket (Review user manual)
- JH 20TWCSTD-B1 = Water Cover (Review user manual)

Factory Options:

- Capacitive Touch Screen / Optical Technology Bonding

TESTING / APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th) (pending)
DNV - Det Norske Veritas (pending)
BV - Bureau Veritas (pending)
ClassNK - Nippon Kaiji Kyokai (pending)
ABS - American Bureau of Shipping (pending)
GL - Germanischer Lloyd (pending)
LRS - Lloyd's Register of Shipping (pending)

Specifications - JH 23T12 MMD-xxx-Axxx

Note: All specifications are subject to change without prior notice!

TFT Technology:

- High Quality SHARP TFT
- 23.1 inch viewable image size
- TFT active-matrix liquid crystal panel
- MVA (Multi-domain Vertical Alignment) LCD Technology

TFT Characteristics:

- Pixel Number : 1600 x 1200
- Pixel Pitch (RGB) : 0.294 (H) x 0.294 (V) mm
- Response Time : 20 ms (typical), "black" to "white"
- Contrast Ratio : 500:1 (typical)
- Light Intensity : 250 cd/m2 (typical)
- Viewable Angle : +/- 85 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 470.4 (H) x 352.8 (V) mm
- Max Colors : 16.7 millions

Synchronisation:

Sync Signal:
- Digital separate synchronisation
- Composite synchronisation
- Synchronisation on green.
- Auto detects VGA -> UXGA, interlaced and non interlaced
- Video Signal : Analog RGB 0,7Vp-p
  : Input Impedance 75 Ohm

Synchronisation Range:
- Horizontal : 15,0 kHz to 91,1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimum picture quality*

Supported Signals:

Resolutions:
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768
- SXGA : 1280 x 1024
- UXGA : 1600 x 1200*

** Recommended for optimum picture quality. (60 Hz only)*

Video Signals:
- Interlaced NTSC and PAL/SECAM video
- Composite video

Power Specifications:

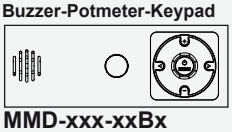
Power Supply:
- 115 & 230VAC - 50 / 60Hz - JH 23T12 MMD-Axx-xxxx

Power Consumption:
Operating : TBD

Typical Type Numbers:

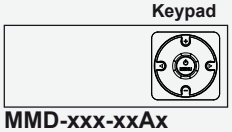
- JH 23T12 MMD-AA1-AAAA = Standard AC, Keypad Controls only
- JH 23T12 MMD-AA1-AOAC = Standard AC, Capacitive Touch Screen*
- JH 23T12 MMD-AA1-AOBA = Standard AC, Bonded, Potmeter Controls+Buzzer

Buzzer-Potmeter-Keypad



MMD-xxx-xxBx

Keypad



MMD-xxx-xxAx

- For a full overview, please review our typenumber sheet found on our website:
http://www.hatteland-display.com/pdf/misc/ind100780-1_series1redesign_typenumber_desc.pdf

**Note that all 23 inch with touch screens are by factory default delivered with bonding. This is due to the physical size of the touch screen and to ensure stability.*

Physical Considerations:

- 584 (W) x 534 (H) x 85 (D) mm - 22.99" (W) x 21.02" (H) x 3.35" (D)
- Weight: 20 kg (approx)

Signal Terminals:

- DVI-I Signal IN : 1 x 29p DVI Female (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15p HD D-SUB (female)
- RGB Signal OUT : 1 x 15p HD D-SUB (female) - Clone of RGB IN**
- Multifunction : 1 x 160p D-SUB (female) - Also see table below
- USB I/O : 1 x TYPE B Conn. (female) Reserved for future use
- AC Power IN : 1 x Std IEC Inlet
- AC Power OUT : 1 x Std IEC Outlet

**Tested at recommended resolutions. The RGB output signal is at same resolution and sync as the RGB input. The output is working even if the display unit is turned off, but power cable/supply must be connected/provided.

HATTELAND® Multifunction Cable:

The factory standard cable is delivered with the following connectors.
2 Standard cables are defined. Standard cable length is 30cm.

#1	• COM1	: 1 x 9p D-SUB (female) - RS232
	• Composite Video IN	: 3 x BNC (female)
#2	• COM1	: 1 x 9p D-SUB (female) - RS232
	• Composite Video IN	: 3 x BNC (female)
	• COM Touch	: 1 x 9p D-SUB (female) - For touch screen

Customized cables are possible to support more built-in signals, like: RS-232, RS-485, RS-422/RS-485, Buzzer, ON/OFF, Touch (RS-232 or PS/2), 1 x S-Video IN, 3 x Composite Video IN, Remote External User Controls, Alternative Keypad interface (i2c) and reserved for other signals. Custom cable lengths can be manufactured.

User Controls:

On front bezel - Keypad control (IP66) xxx-xxAx models:
- Power On/Off and On Screen Display Menu (push button)
- Brightness Control (up/down - push buttons)
- Hotkeys (left/right - push buttons)
- Mode Status Red/Green Illuminated LED-Ring Indicator

On front bezel - Potmeter control (IP66) xxx-xxBx models:
- Power On/Off and On Screen Display Menu (push button)
- Brightness Control (rotary control)
- Hotkeys (left/right - push buttons)
- Mode Status Red/Green Illuminated LED-Ring Indicator
- Speaker / Buzzer

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
  - Humidity up to 95%
- Storage : Temperature -20 deg. C to +60 deg. C
  - Humidity up to 95%
- IP Rating : EN60529 (IP66) (Applies for flush mount)
- Compass Safe Dist. : JH23T12MMD-xxx-xxxx - Std: 1.60m Steering: 1.05m

Safety Considerations:
Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Available Accessories:

- Cables = Custom Multifunction Cable to support more signals
- JH 23TBR T01-A1 = Bracket (Review bracket datasheet/user manual)
- JH MMDROSTD-A1= Rotary Bracket (Review bracket datasheet/manual)
- JH 23TSV STD-A1 = Sun Visor (Review user manual)
- JH VESA 23T01-A1= Vesa Bracket (Review user manual)
- JH 23TWC STD-B1= Water Cover (Review user manual)

Factory Options:

- Capacitive Touch Screen / Optical Technology Bonding

TESTING / APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th)
DNV - Det Norske Veritas
BV - Bureau Veritas
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
GL - Germanischer Lloyd
LRS - Lloyd's Register of Shipping (pending)

Specifications - JH 27T11 MMD-xxx-Axxx

Note: All specifications are subject to change without prior notice!

TFT Technology:

- High Quality SAMSUNG TFT
- 27.0 inch viewable image size - Widescreen
- Color Active Matrix, a-SI (amorphous silicon) Thin Film Transistor (TFT)
- S-PVA (Super Patterned Vertical Alignment) mode

TFT Characteristics:

- Pixel Number : 1920 x 1200
- Pixel Pitch (RGB) : 0.303 (H) x 0.303 (V) mm
- Response Time : 6 ms (typical) G-to-G
- Contrast Ratio : 1000:1 (typical)
- Light Intensity : 500 cd/m2 (typical)
- Viewable Angle : +/- 89 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 581.76 (H) x 363.6 (V) mm
- Max Colors : 16.7 millions

Synchronisation:

Sync Signal:
- Digital separate synchronisation
- Composite synchronisation
- Synchronisation on green.
- Auto detects signals, interlaced and non interlaced
- Video Signal : Analog RGB 0,7Vp-p
  : Input Impedance 75 Ohm

Synchronisation Range:
- Horizontal : 15,0 kHz to 91,1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimum picture quality*

Supported Signals:

Resolutions:
- VGA : 640 x 480 (including 640 x 350)
- SVGA : 800 x 600 (including 720 x 400)
- XGA : 1024 x 768
- SXGA : 1280 x 1024
- UXGA : 1600 x 1200
- WUXGA : 1920 x 1200*

** Recommended for optimum picture quality. (60 Hz)*

Video Signals:
- Interlaced NTSC and PAL/SECAM video
- Composite video

Power Specifications:

Power Supply:
- 115& 230VAC - 50 / 60Hz - JH 27T11 MMD-Axx-xxxx

Power Consumption:
Operating : 200 W (max)

Typical Type Numbers:

- JH 27T11 MMD-AA1-AOBA = Standard AC, Bonded, Potmeter Controls, Buzzer

- For a description of typenumbers, please see:
http://www.hatteland-display.com/pdf/misc/ind100780-1_series1redesign_typenumber_desc.pdf

Physical Considerations:

- 660.00 (W) x 481.00 (H) x 101.50 (D) mm
- 25,98" (W) x 18,94" (H) x 4,00" (D)
- Weight: Approx 16kg (w/no brackets)

Signal Terminals:

- DVI-I Signal IN : 1 x 29p DVI Female (or as RGB IN with adapter)
- RGB Signal IN : 1 x 15p HD D-SUB (female)
- RGB Signal OUT : 1 x 15p HD D-SUB (female) - Clone of RGB IN**
- Multifunction : 1 x 160p D-SUB (female) - Also see table below
- USB I/O : 1 x TYPE B Conn. (female) Reserved for future use
- AC Power IN : 1 x Std IEC Inlet
- AC Power OUT : 1 x Std IEC Outlet

**Tested at recommended resolutions. The RGB output signal is at same resolution and sync as the RGB input. The output is working even if the display unit is turned off, but power cable/supply must be connected/provided.

HATTELAND® Multifunction Cable:

The factory standard cable is delivered with the following connectors.
2 Standard cables are defined. Standard cable length is 30cm.

#1	• COM1	: 1 x 9p D-SUB (female) - RS232
	• Composite Video IN	: 3 x BNC (female)
#2	• COM1	: 1 x 9p D-SUB (female) - RS232
	• Composite Video IN	: 3 x BNC (female)
	• COM Touch	: 1 x 9p D-SUB (female) - For touch screen

Customized cables are possible to support more built-in signals, like: RS-232, RS-485, RS-422/RS-485, Buzzer, ON/OFF, Touch (RS-232 or PS/2), 1 x S-Video IN, 3 x Composite Video IN, Remote External User Controls, Alternative Keypad interface (i2c) and reserved for other signals. Custom cable lengths can be manufactured.

User Controls:

On front bezel - Potmeter control (IP66) xxx-xxBx models:
- Power On/Off and On Screen Display Menu (push button)
- Brightness Control (rotary control)
- Hotkeys (left/right - push buttons)
- Mode Status Red/Green Illuminated LED-Ring Indicator
- Speaker / Buzzer

Environmental Considerations:

- Operating : Temperature -15 deg. C to +55 deg. C
  - Humidity up to 95%
- Storage : Temperature -20 deg. C to +60 deg. C
  - Humidity up to 95%
- IP Rating : EN60529 (IP66) (Applies for flush mount)
- Compass Safe Dist. : JH 27T11 MMD - Std: 50cm Steering: 30cm

Safety Considerations:
Even although the test conditions for bridge units provide for a maximum operating temperature of 55°C, continuous operation of all electronic components should, if possible, take place at ambient temperatures of only 25°C. This is a necessary prerequisite for long life and low service costs.

Available Accessories:

- Cables = Custom Multifunction Cable to support more signals
- JH 27BRD STD-A1 = Table/Foot Bracket (Review own datasheet)
- JH 27VED STD-A1 = Wall/Vesa Mount Bracket (Review own datasheet)

Factory Options:

None

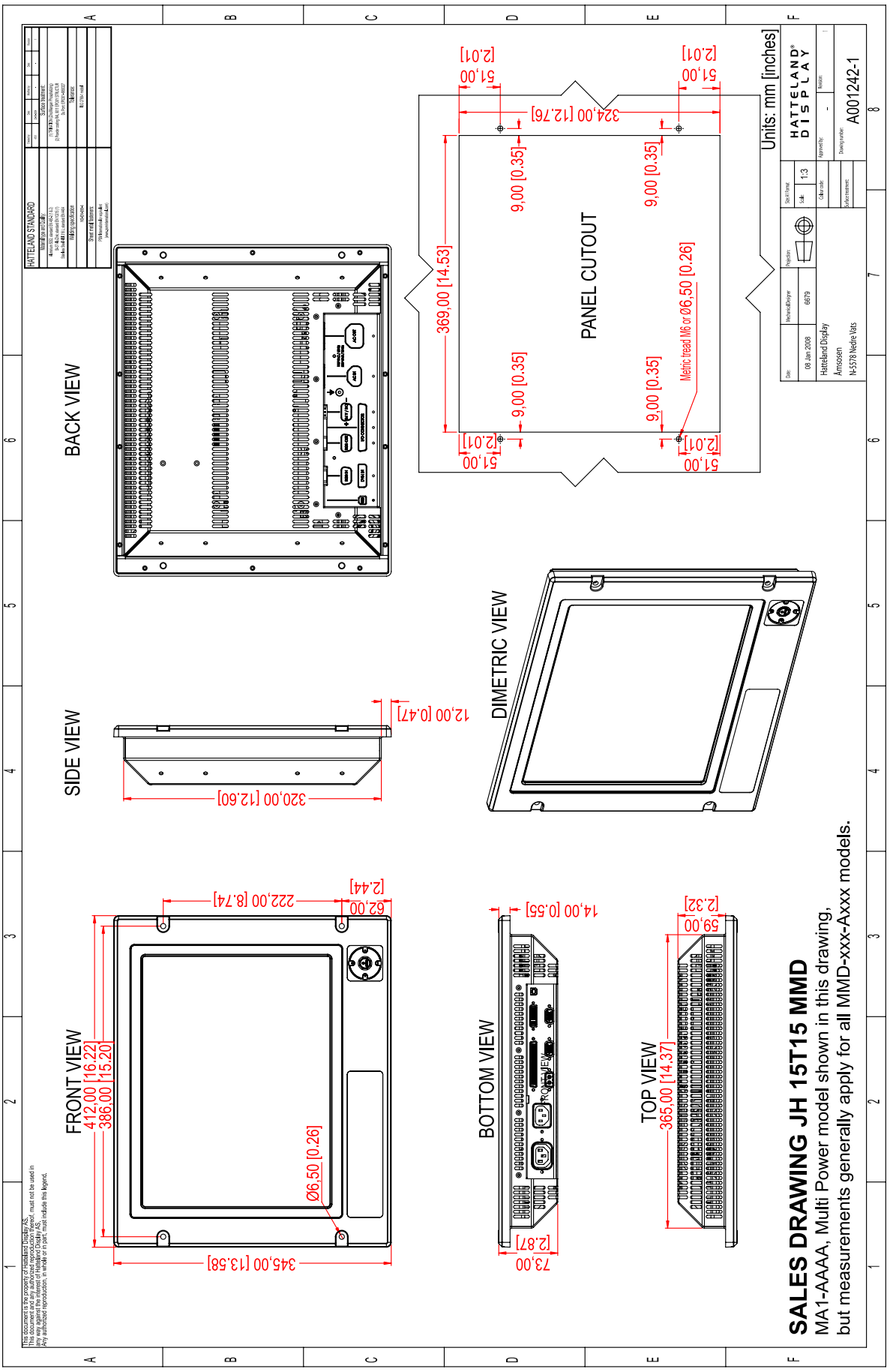
TESTING/APPROVALS & CERTIFICATES

This product have been tested / type approved by the following classification societies:

EN60945 4th (IEC945 4th)
DNV - Det Norske Veritas (pending)
BV - Bureau Veritas (pending)
ClassNK - Nippon Kaiji Kyokai (pending)
ABS - American Bureau of Shipping (pending)
GL - Germanischer Lloyd (pending)
LRS - Lloyd's Register of Shipping (pending)

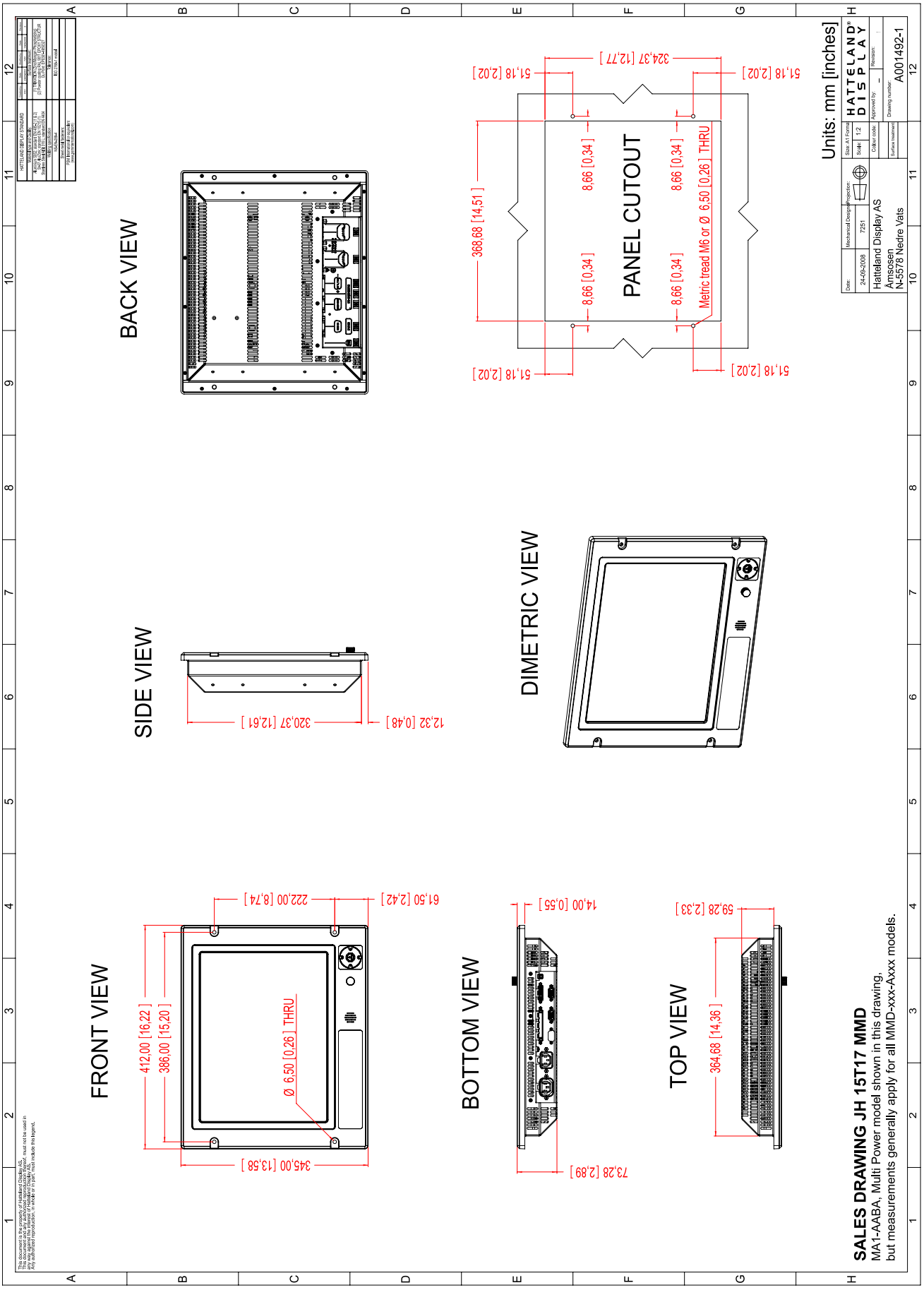
Technical Drawings

Technical Drawings - JH 15T15 MMD-xxx-Axxx



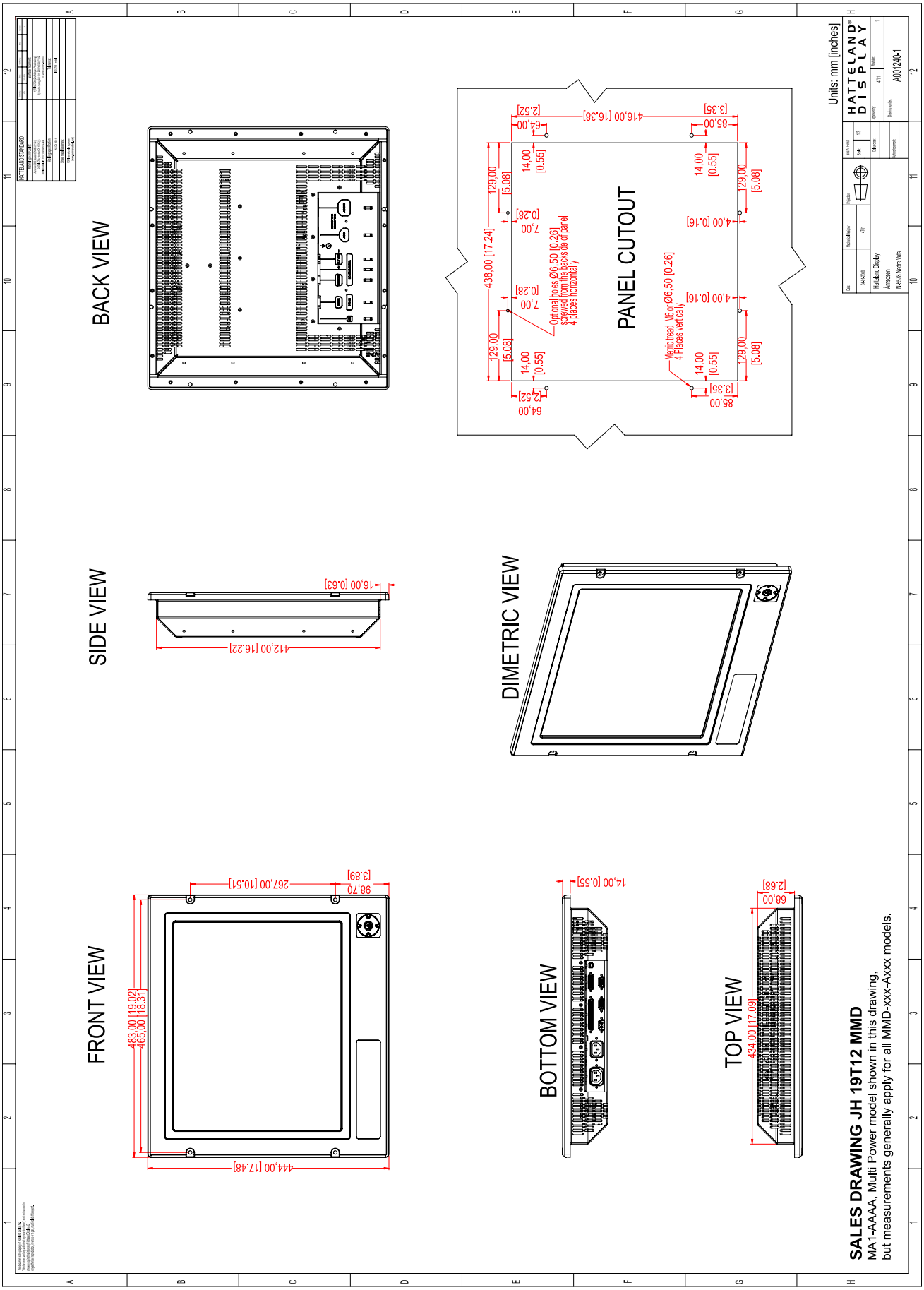
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - JH 15T17 MMD-xxx-Axxx



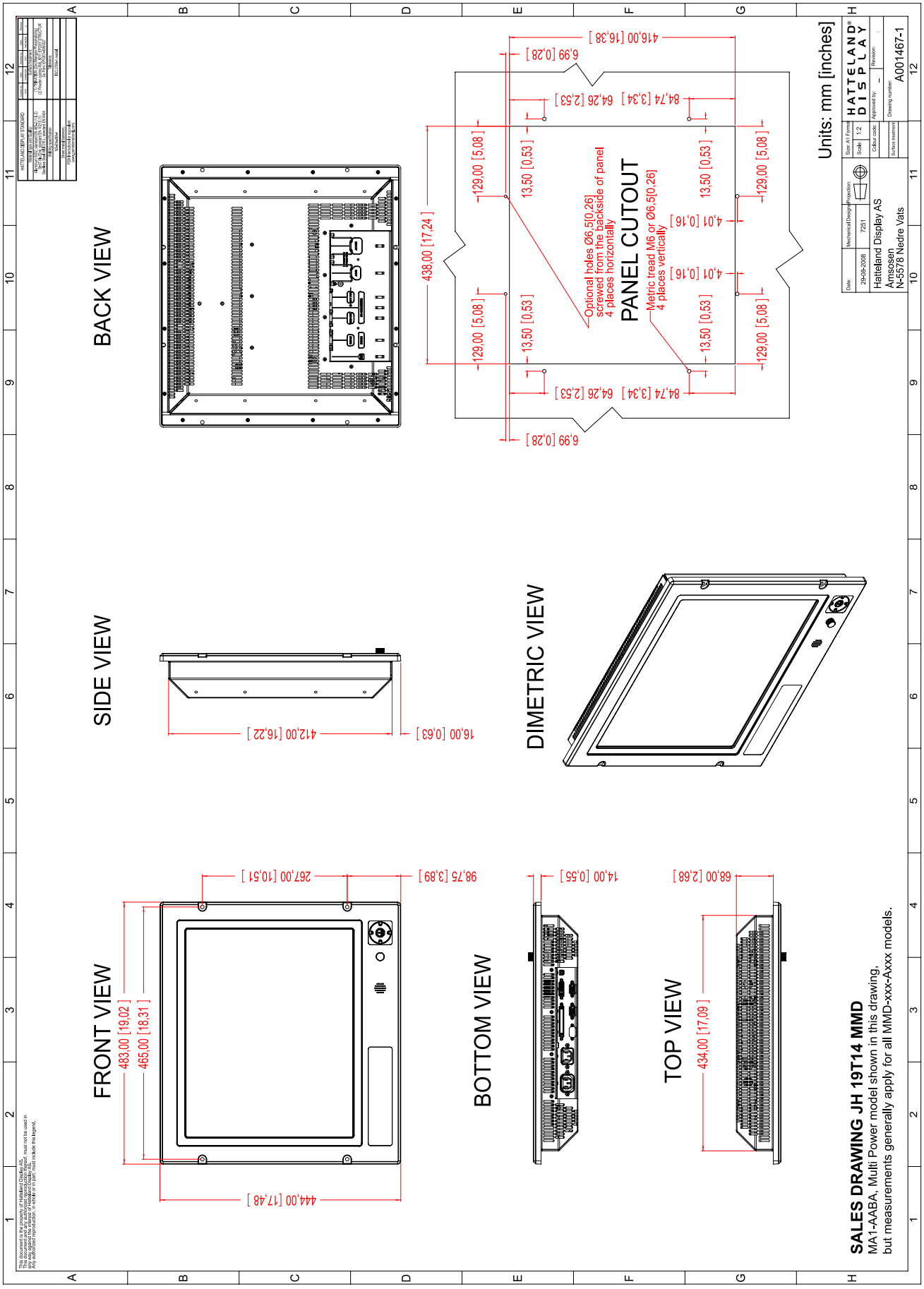
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - JH 19T12 MMD-xxx-Axxx



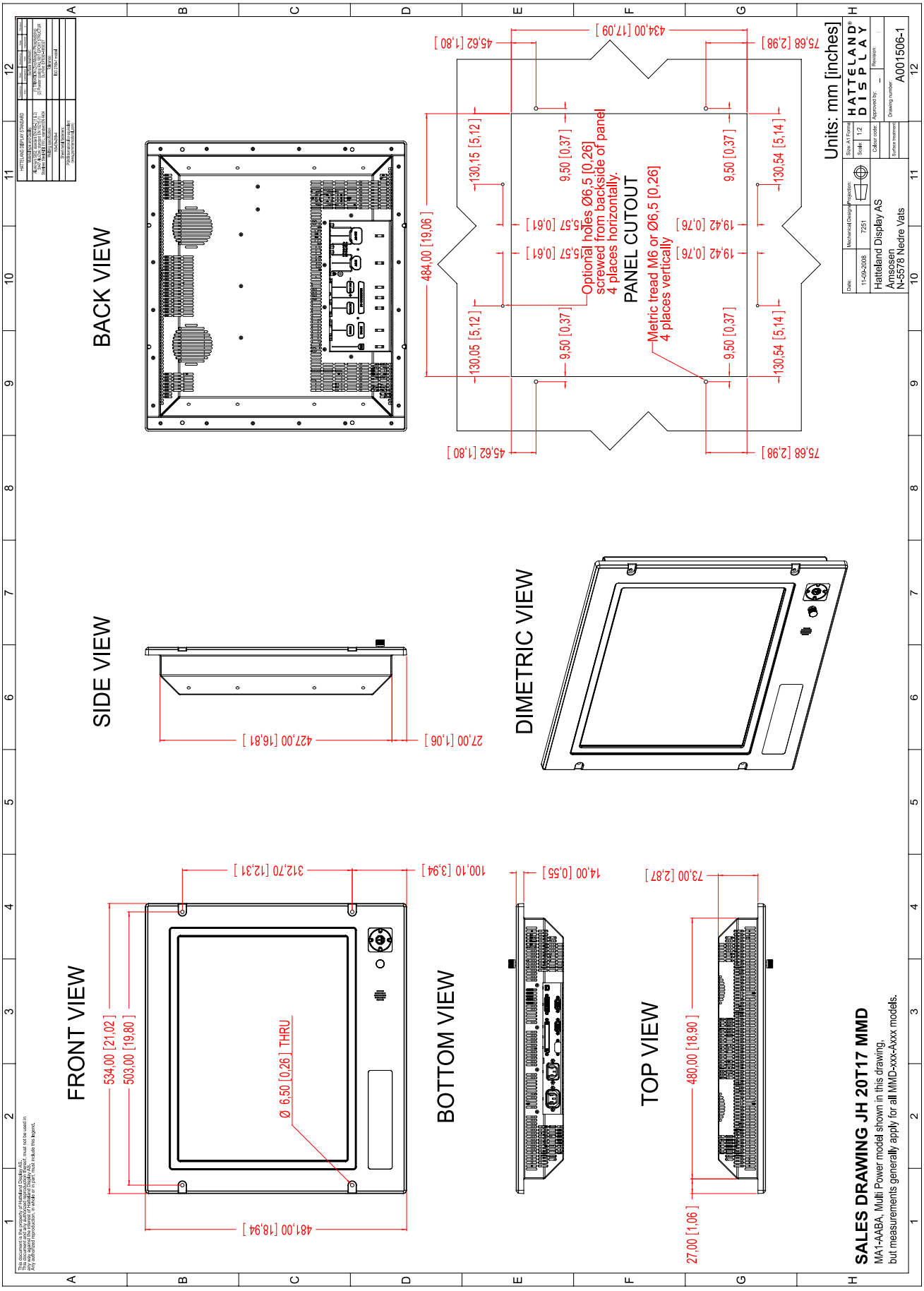
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - JH 19T14 MMD-xxx-Axxx



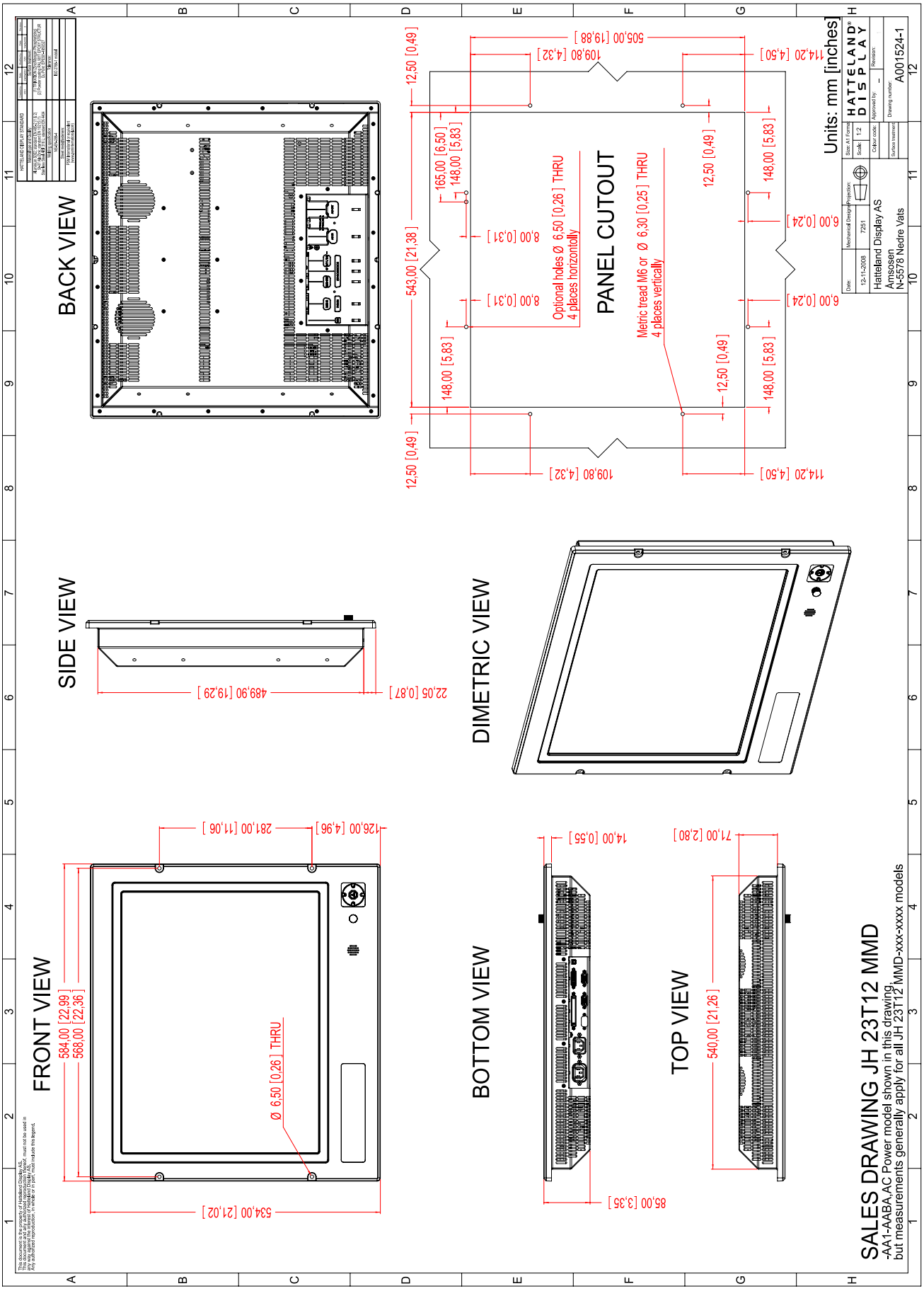
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - JH 20T17 MMD-xxx-Axxx



Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - JH 23T12 MMD-xxx-Axxx



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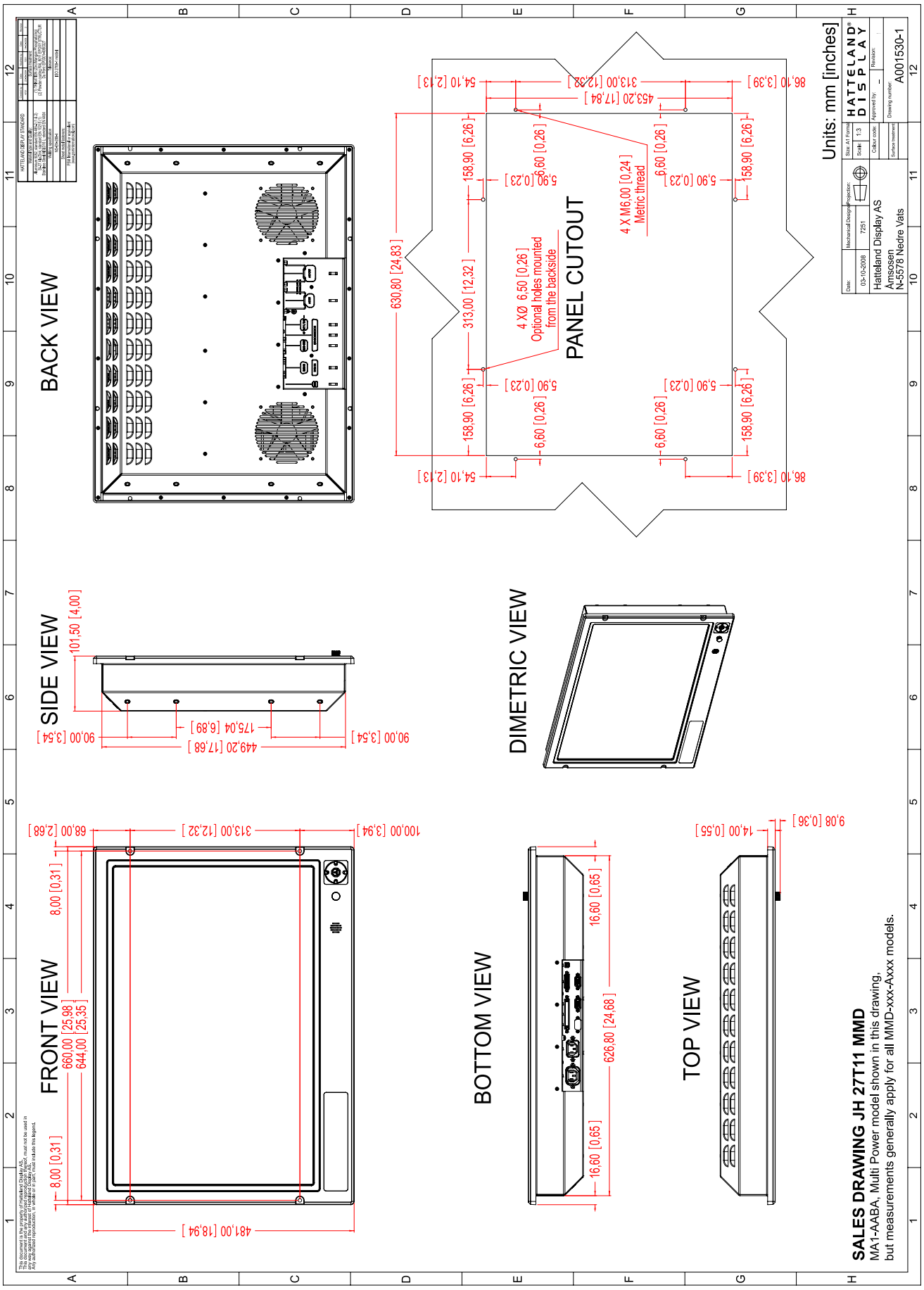
Technical Drawings - JH 27T11 MMD-xxx-Axxx

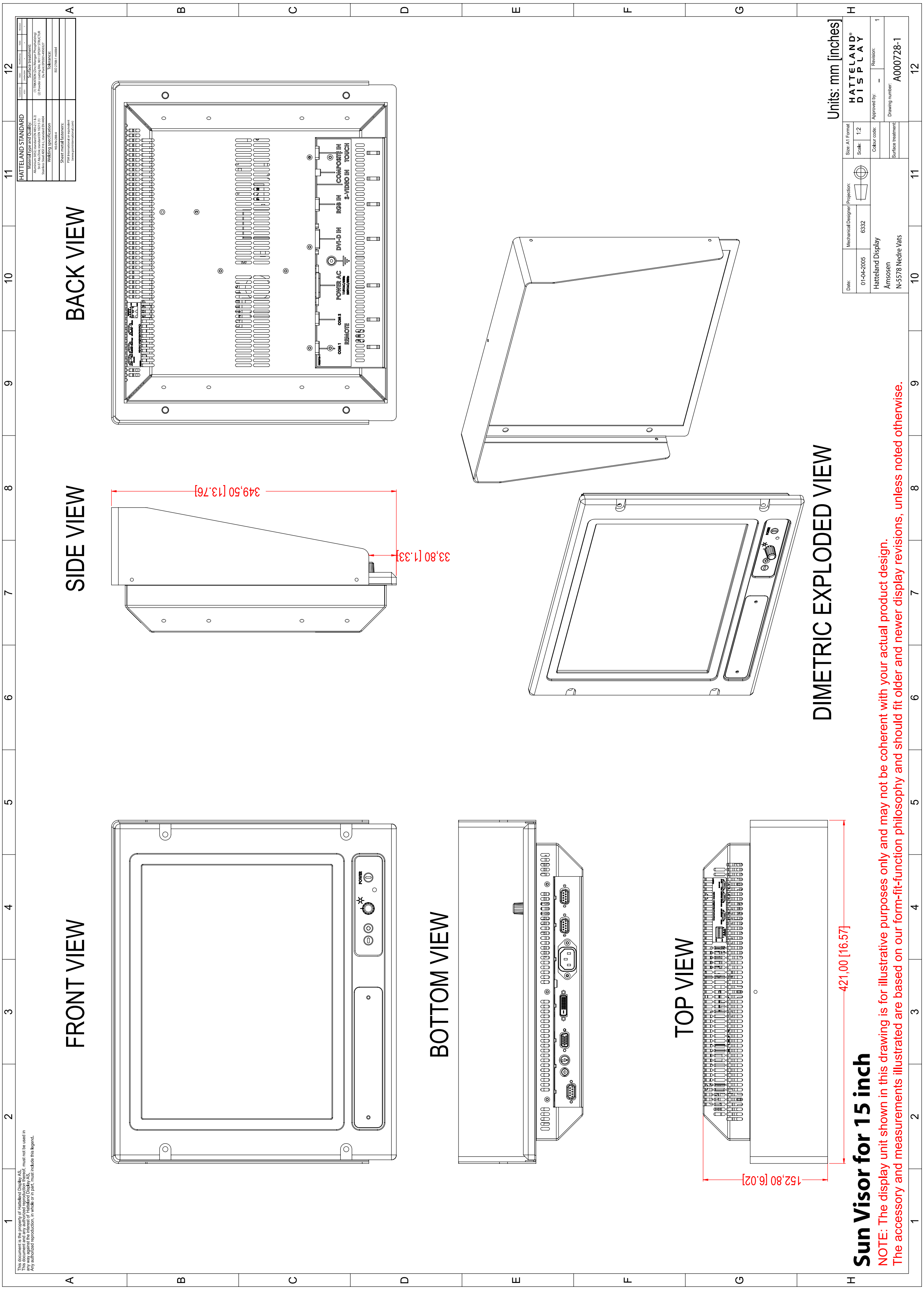


Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

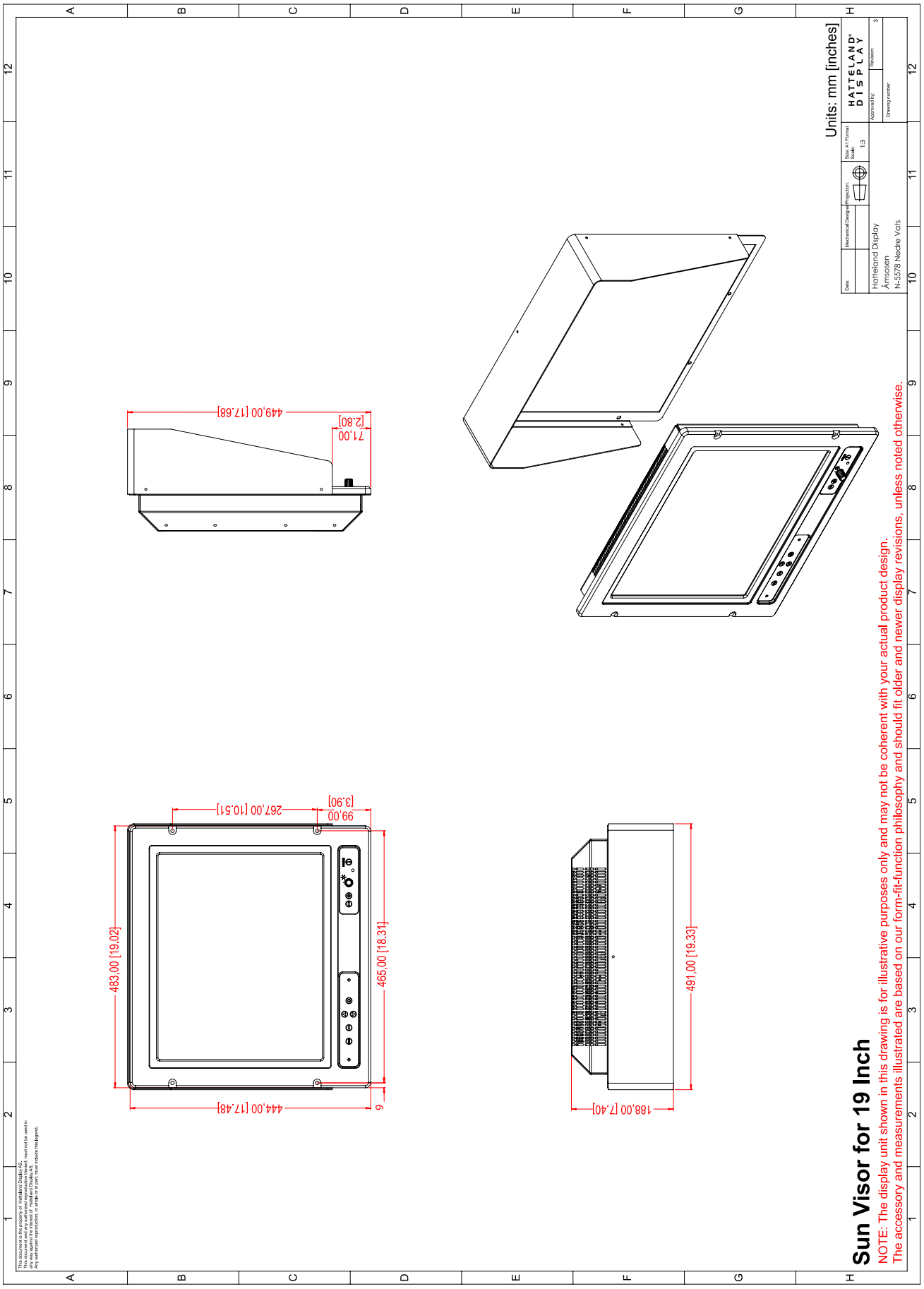
Technical Drawings - Accessories

Technical Drawings - Accessories

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.



Technical Drawings - Accessories



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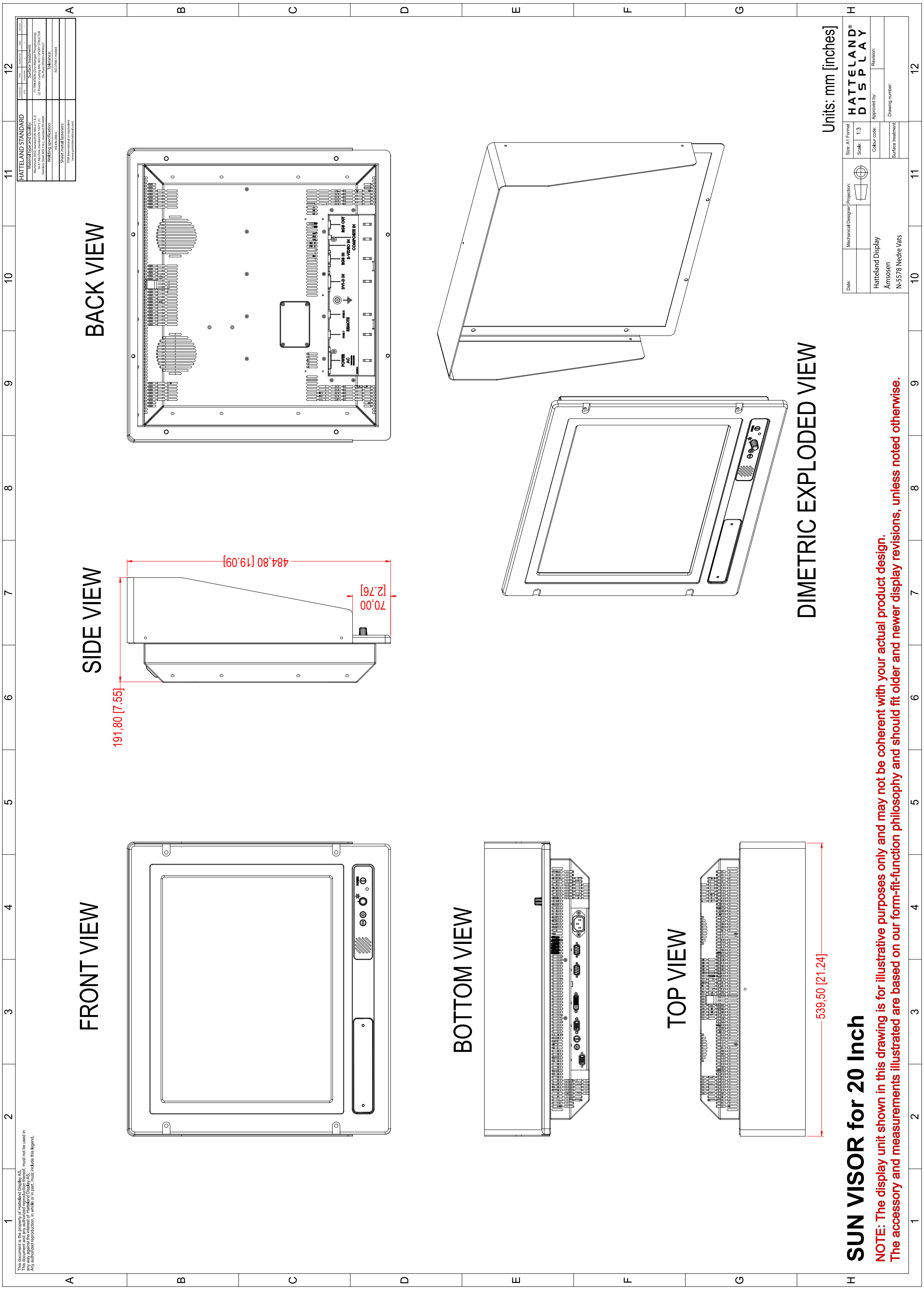
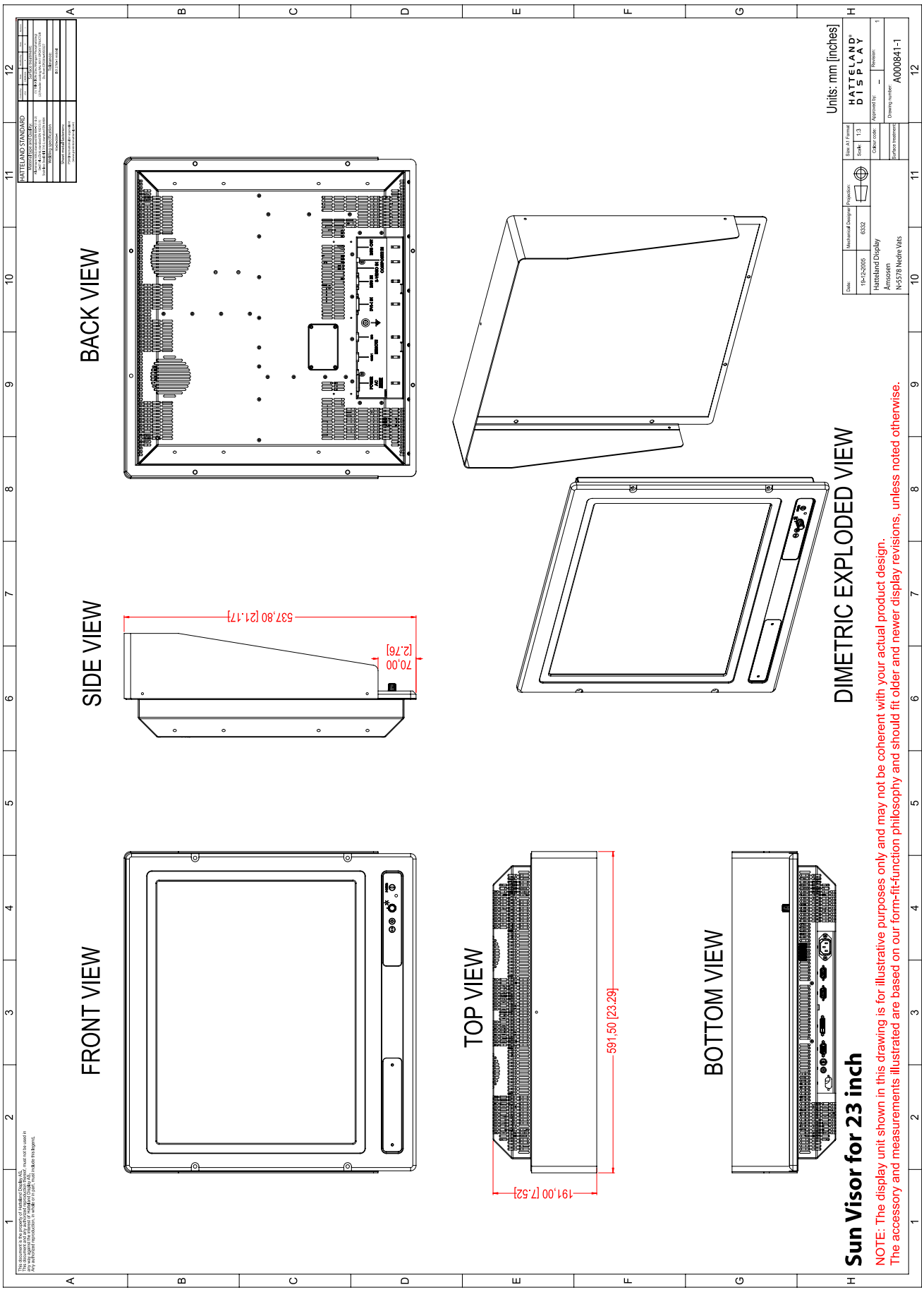
Technical Drawings - Accessories

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

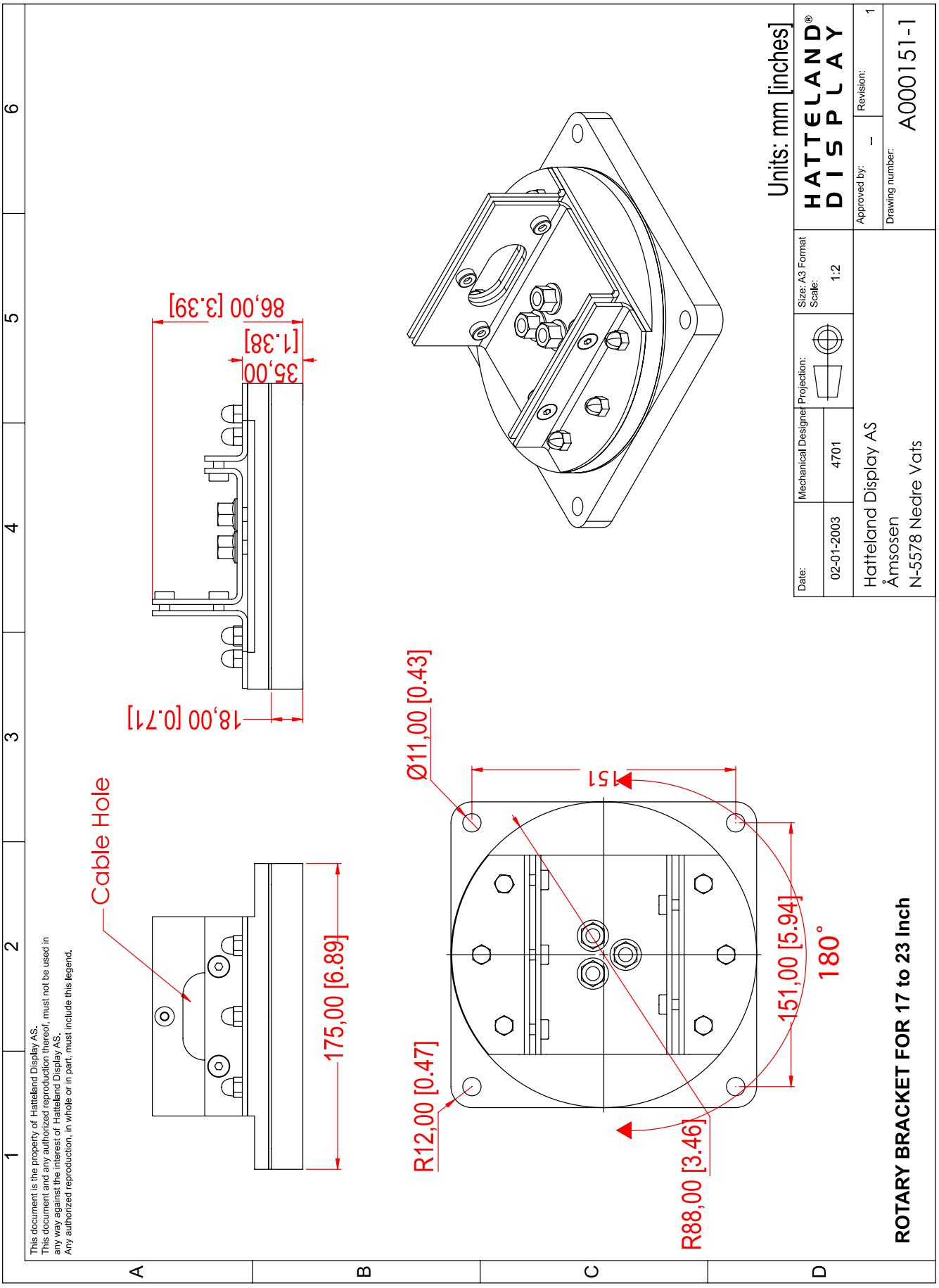


Technical Drawings - Accessories

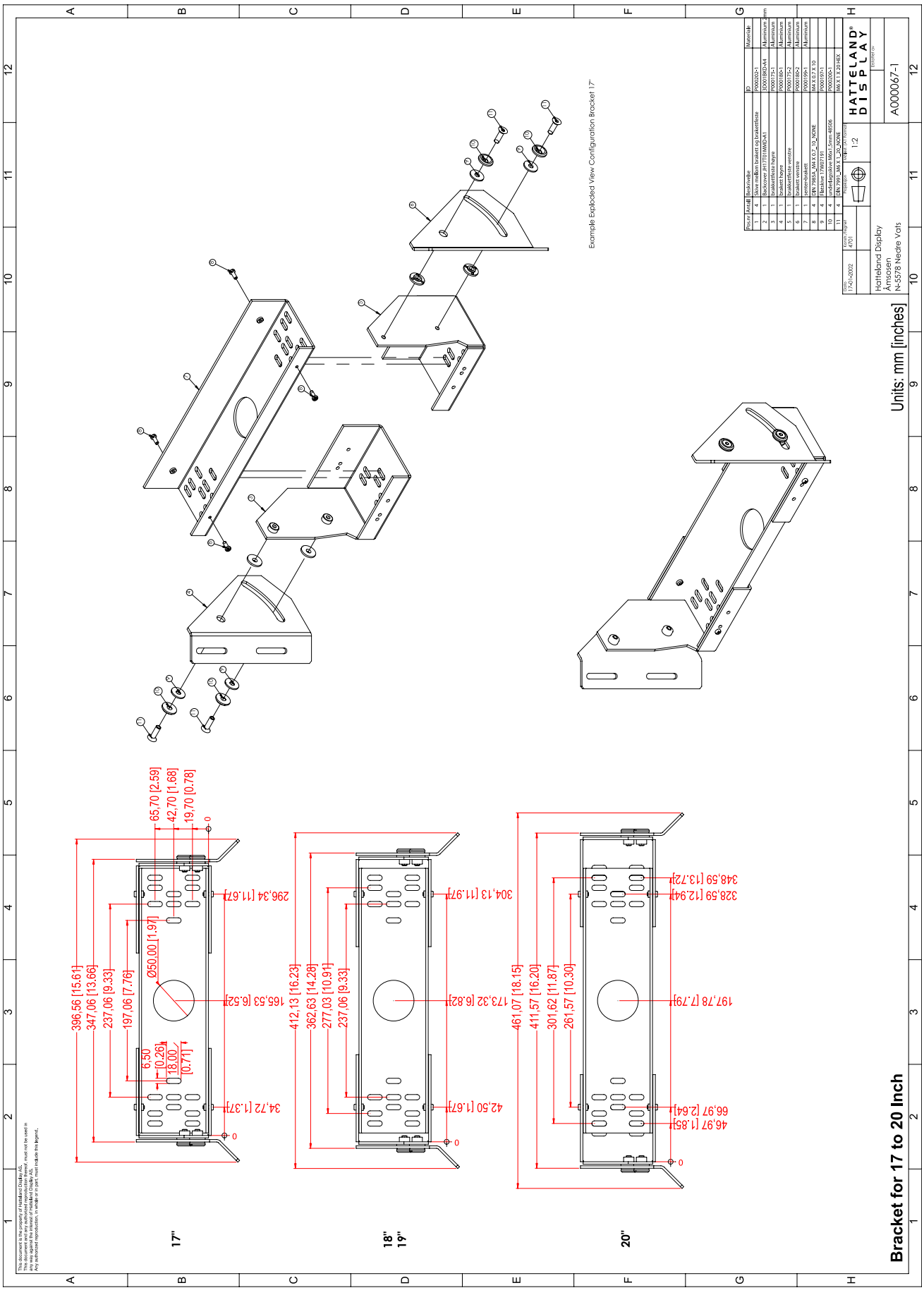


Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

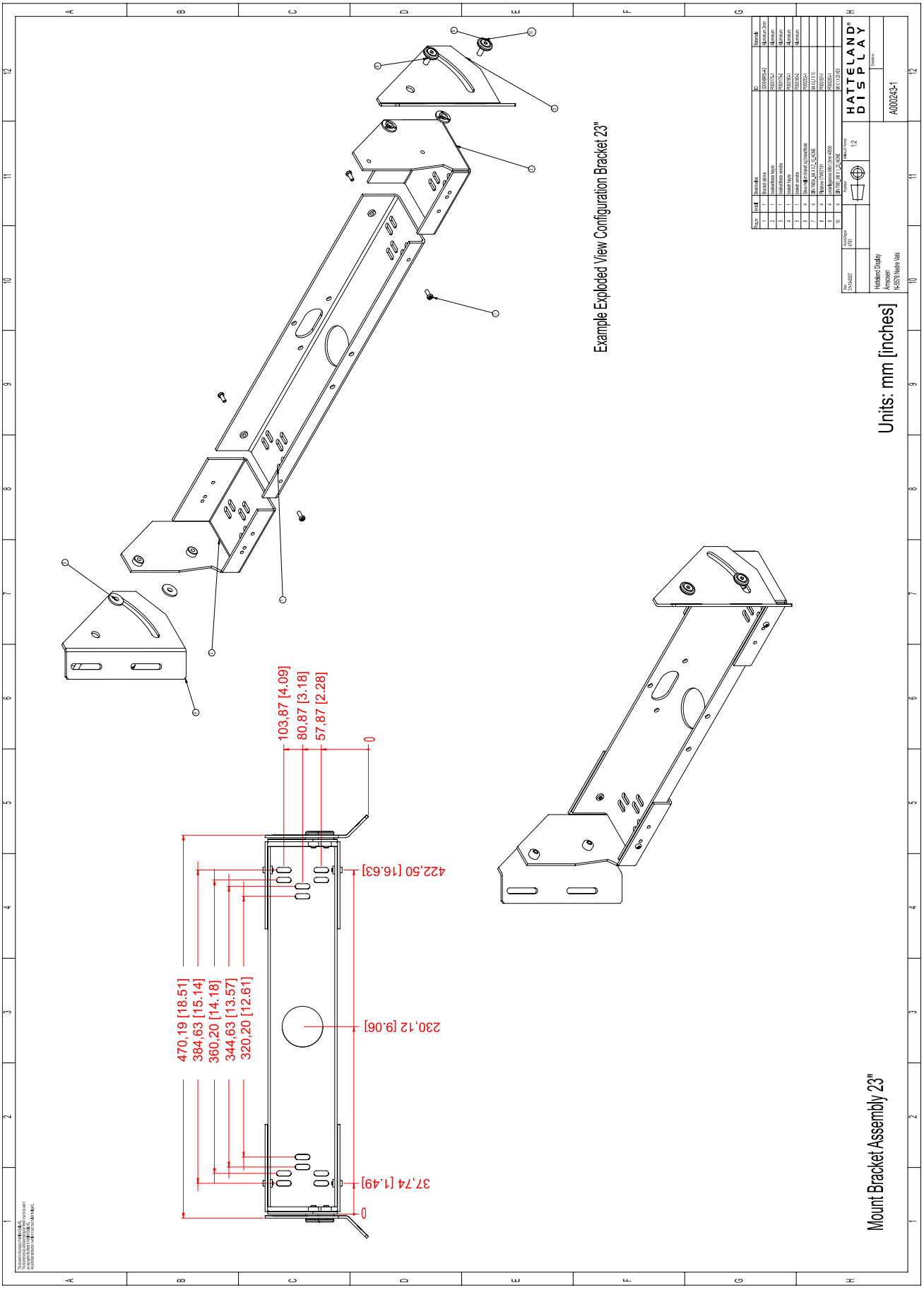
Technical Drawings - Accessories



Technical Drawings - Accessories

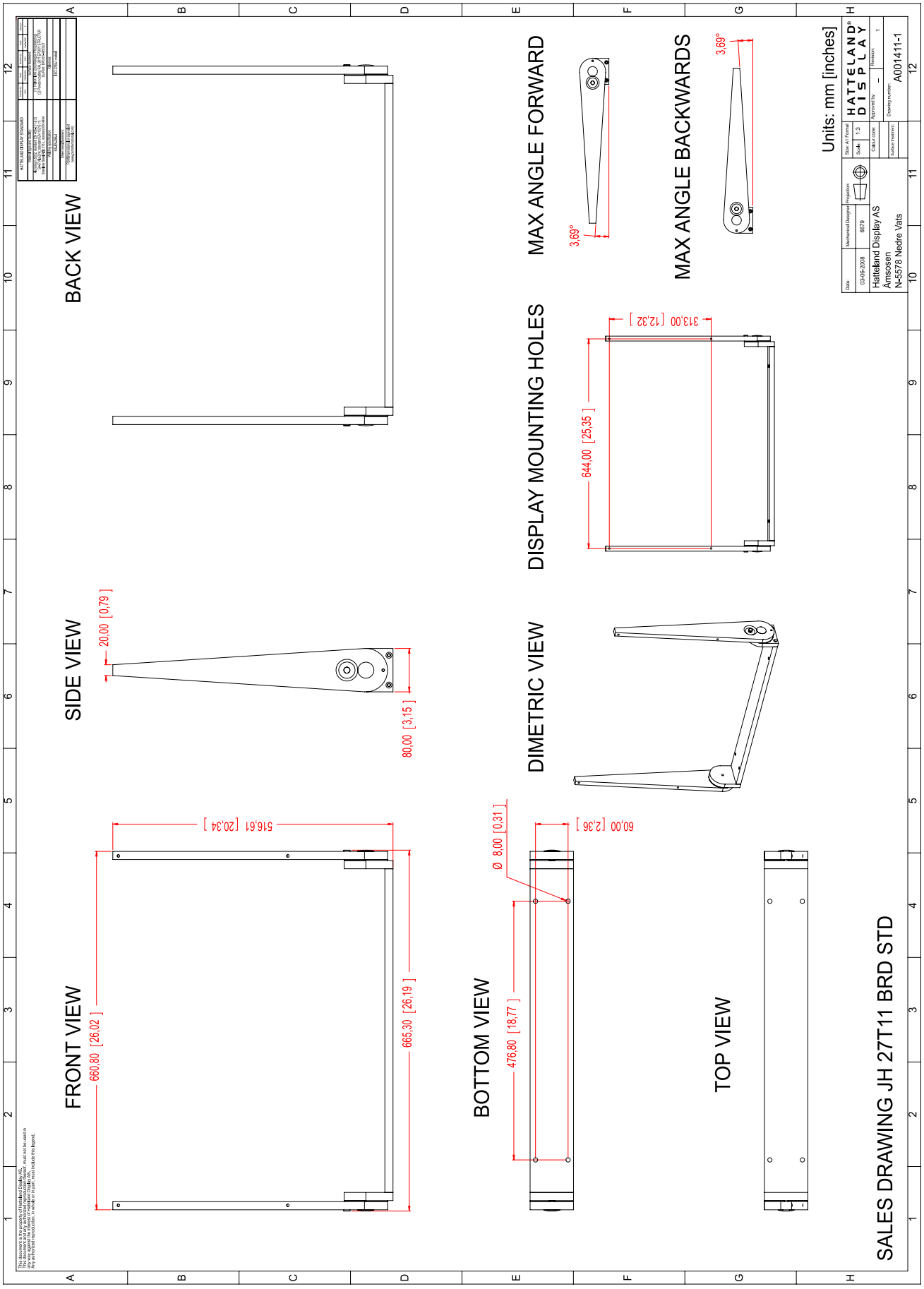


Technical Drawings - Accessories



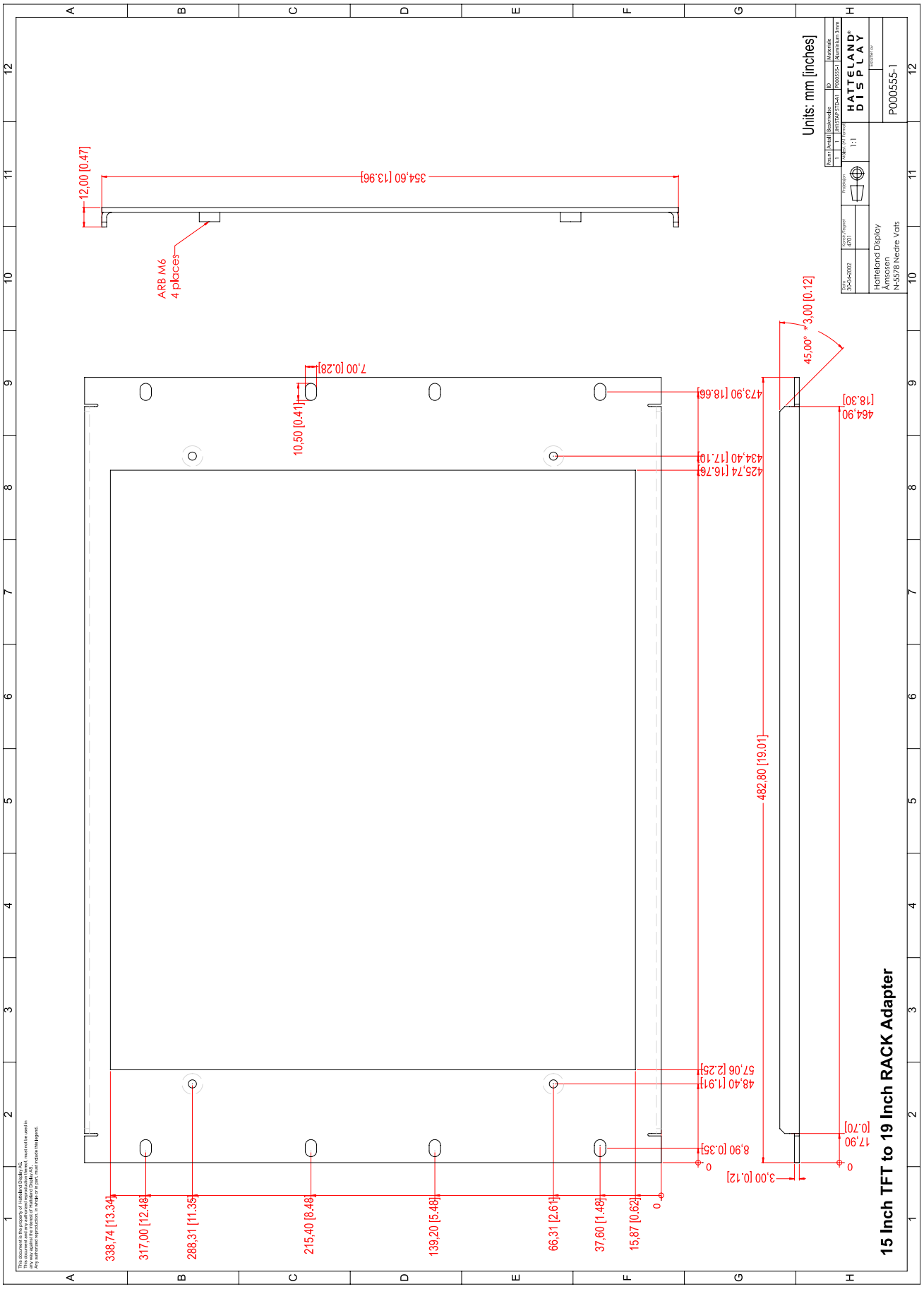
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - Accessories



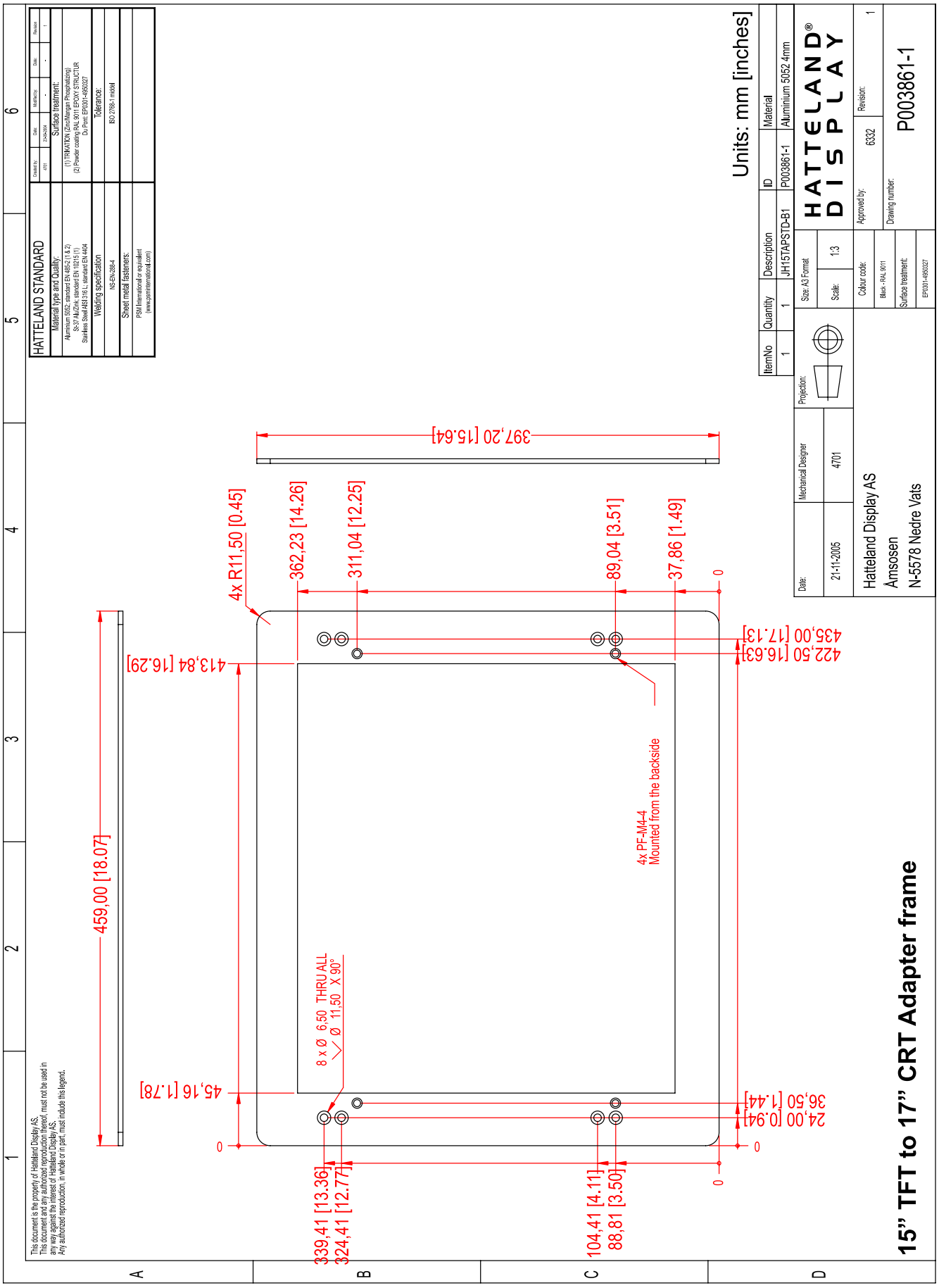
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - Accessories



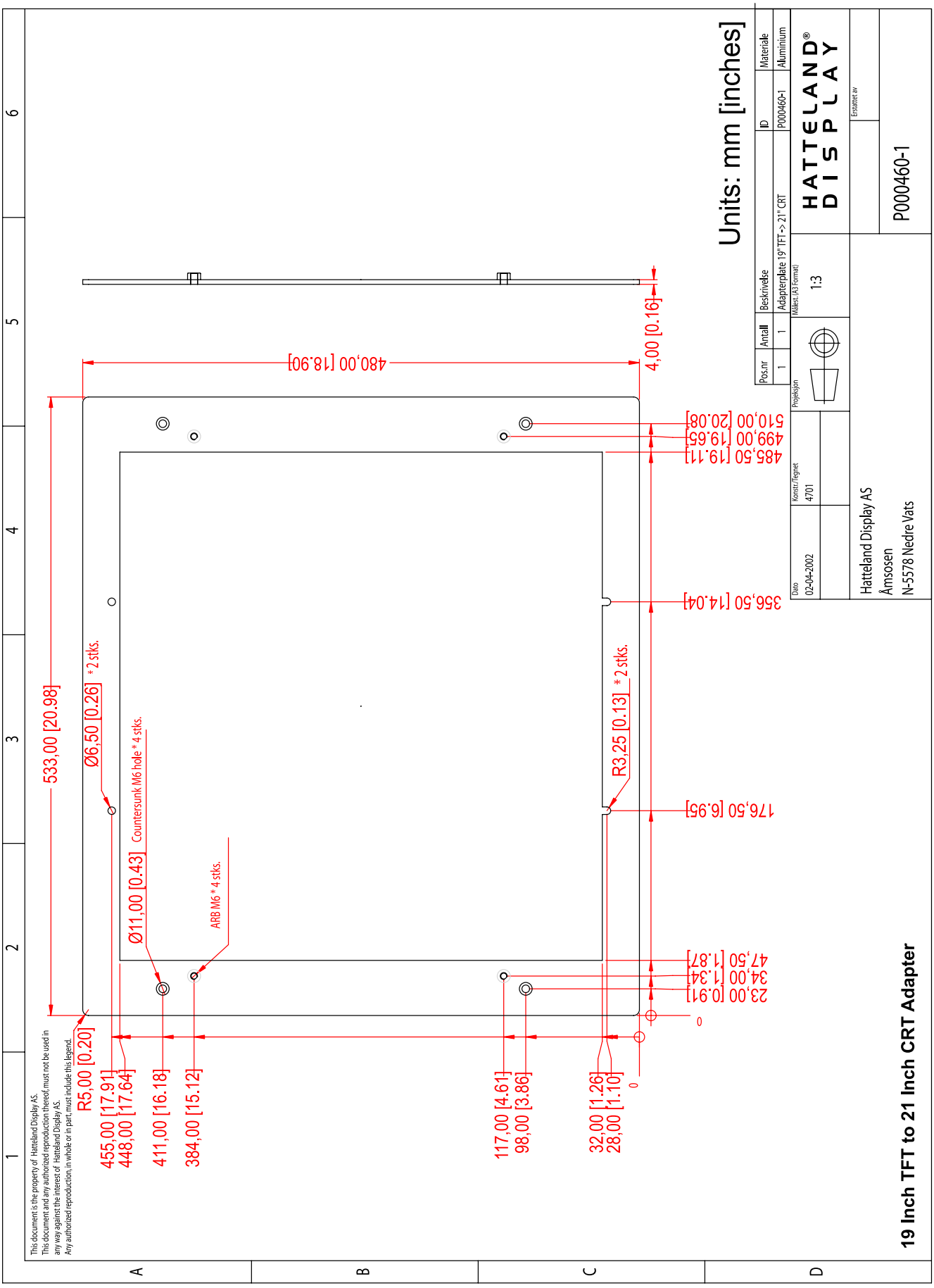
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - Accessories



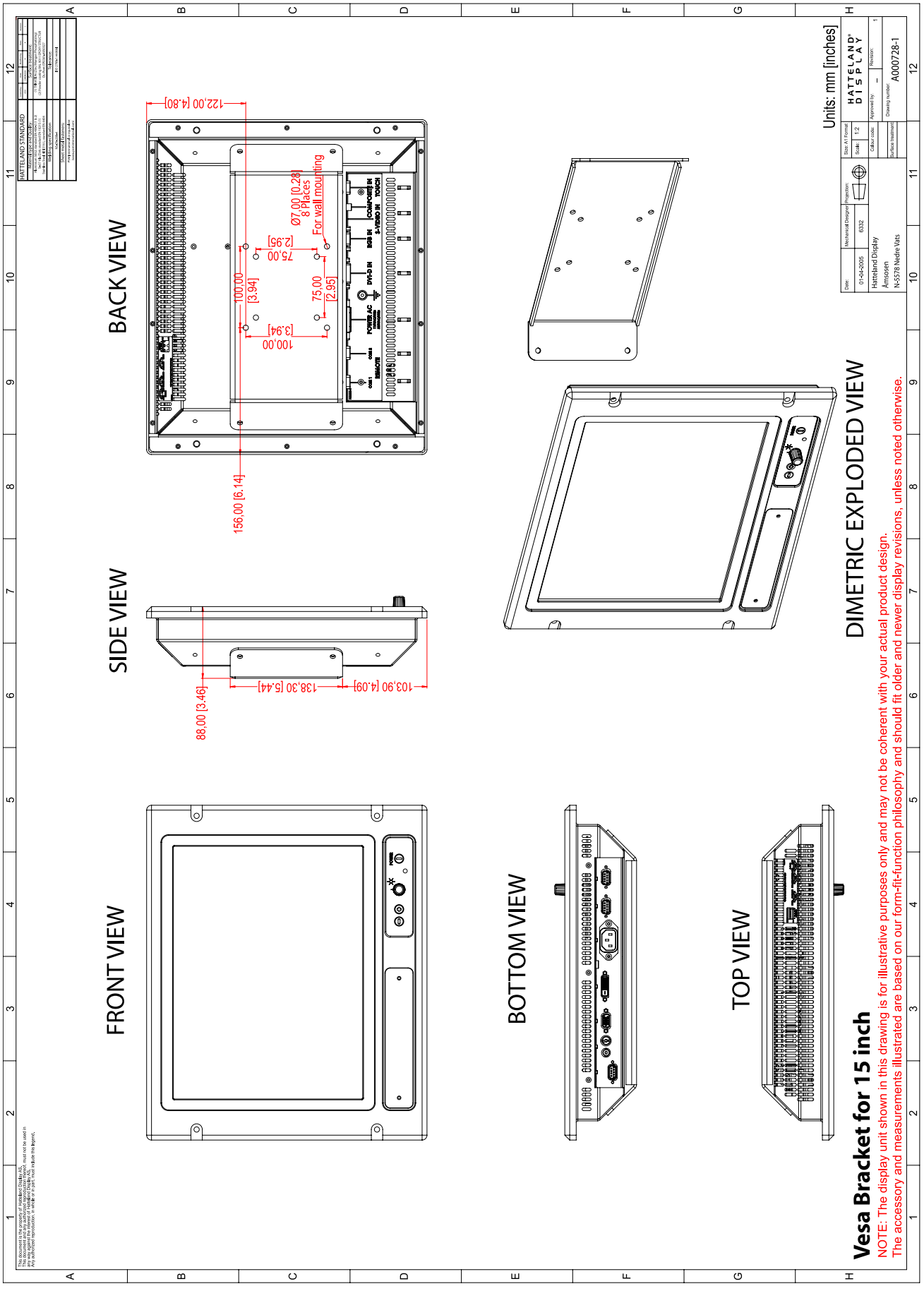
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - Accessories



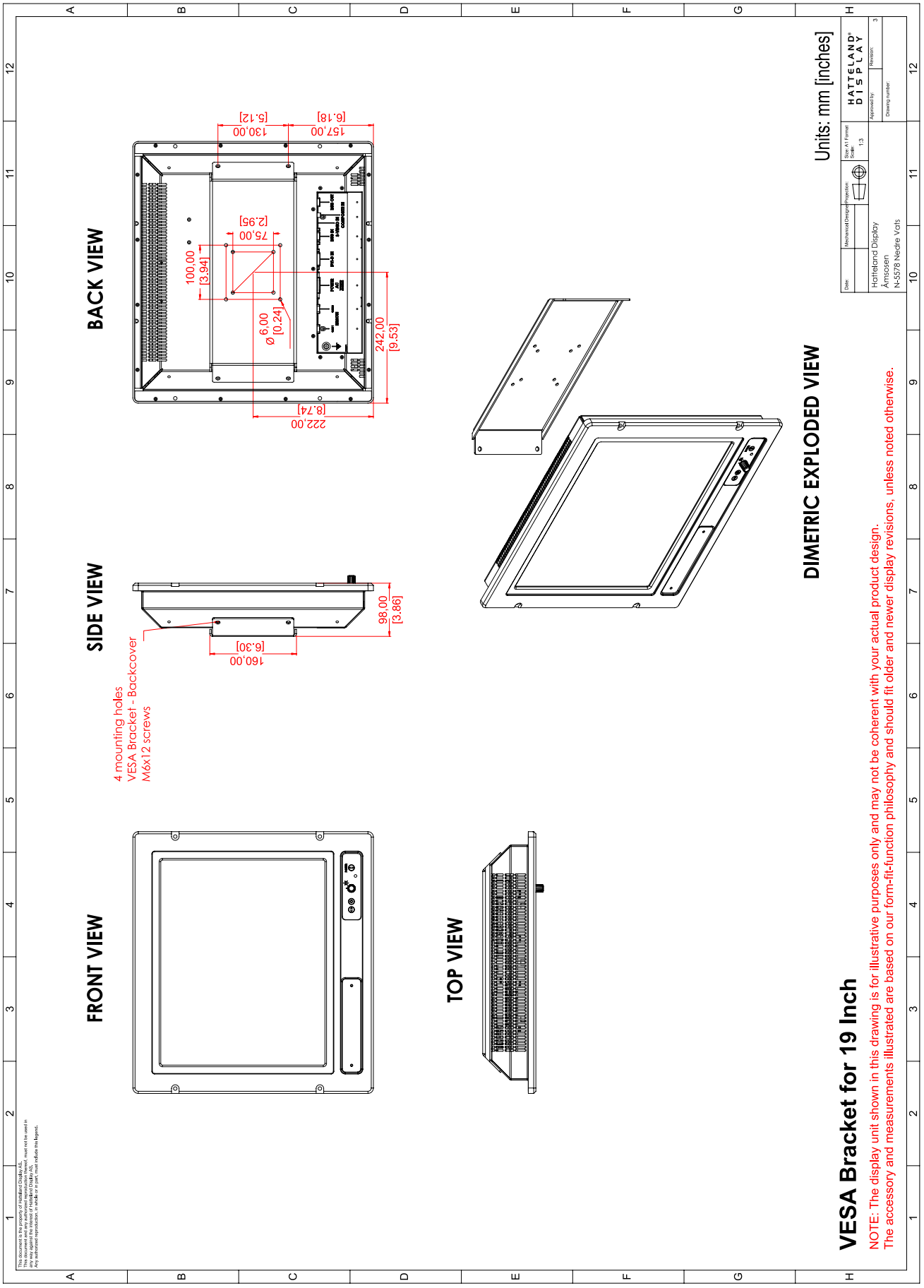
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - Accessories



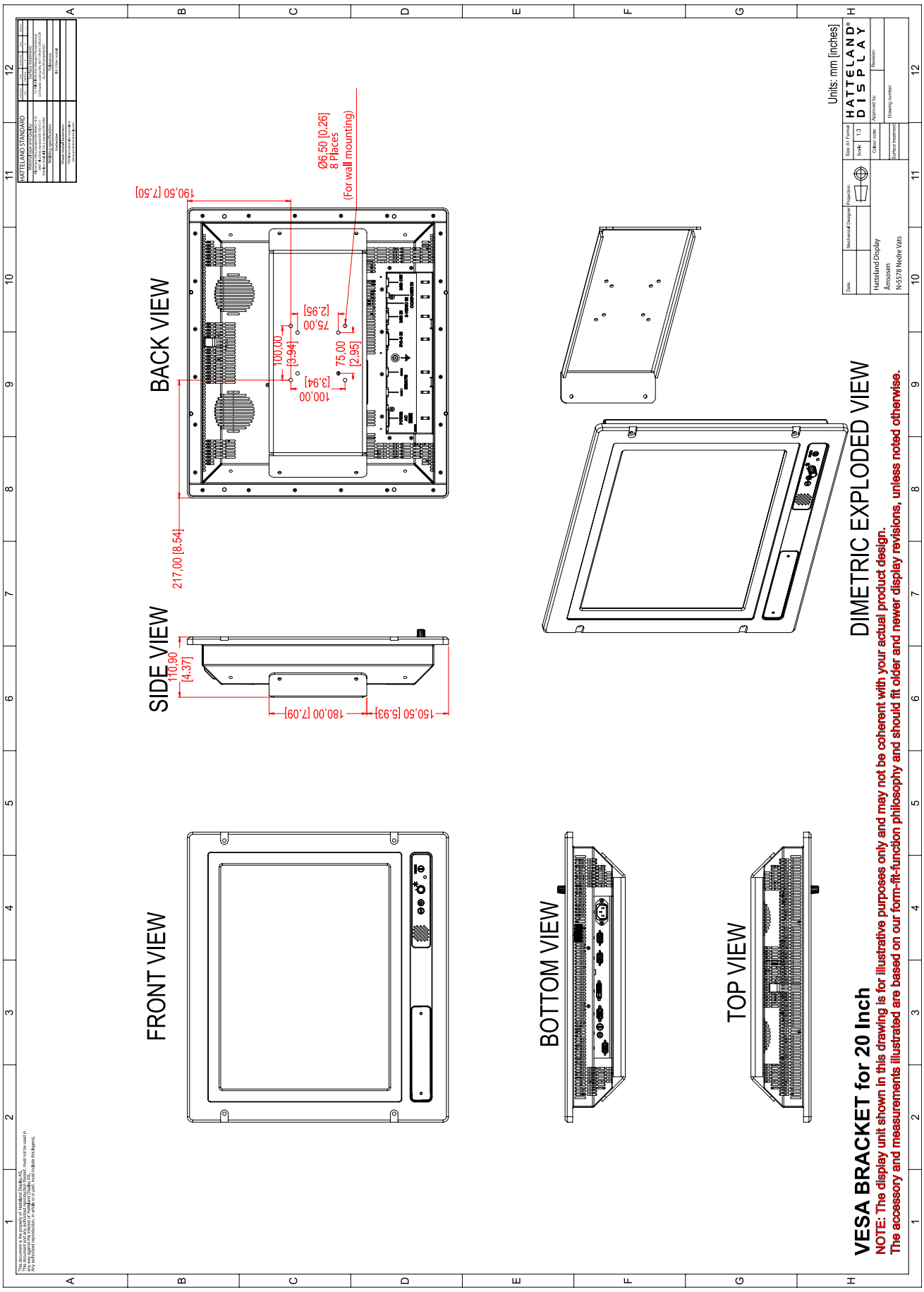
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - Accessories



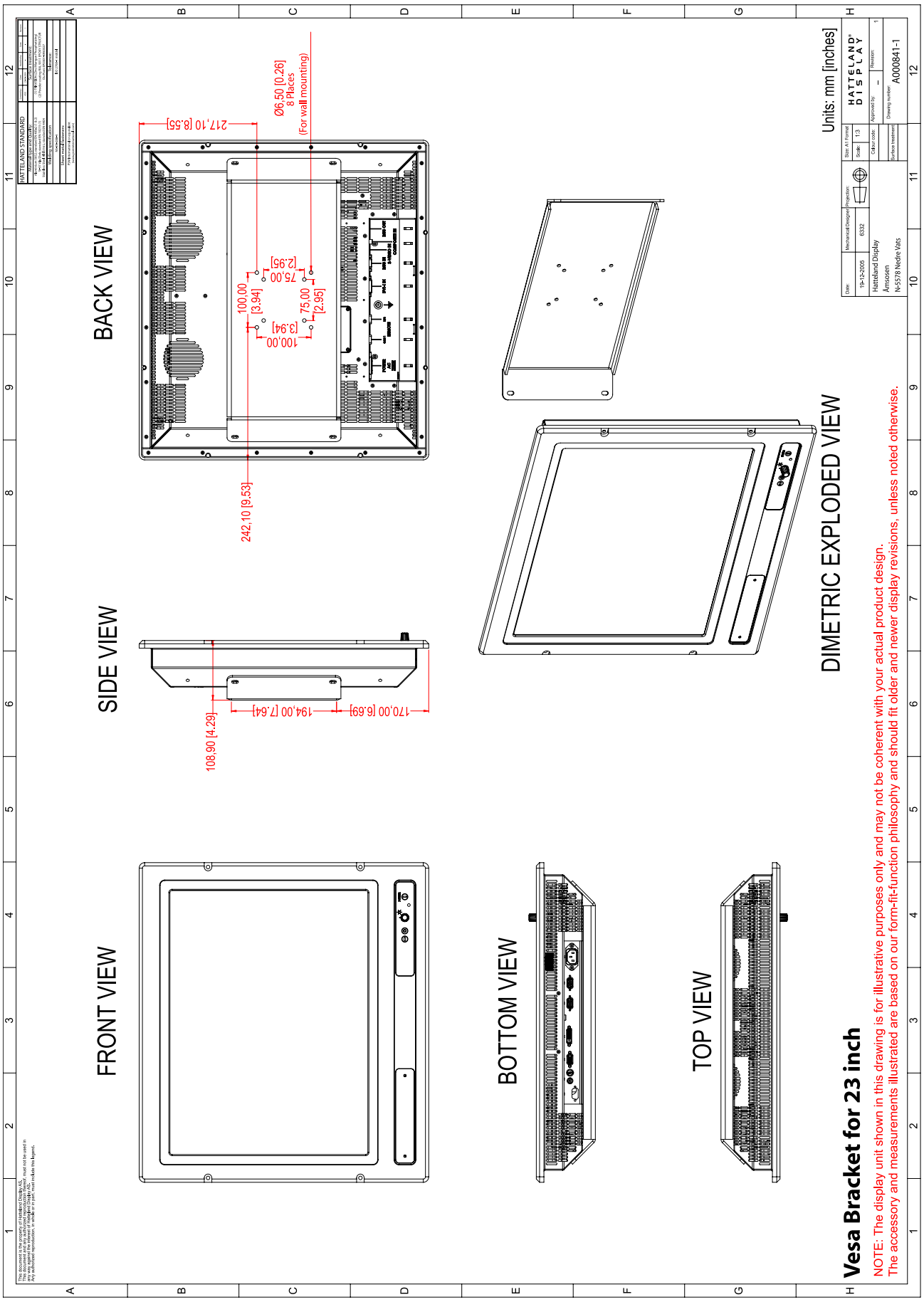
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - Accessories



Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - Accessories



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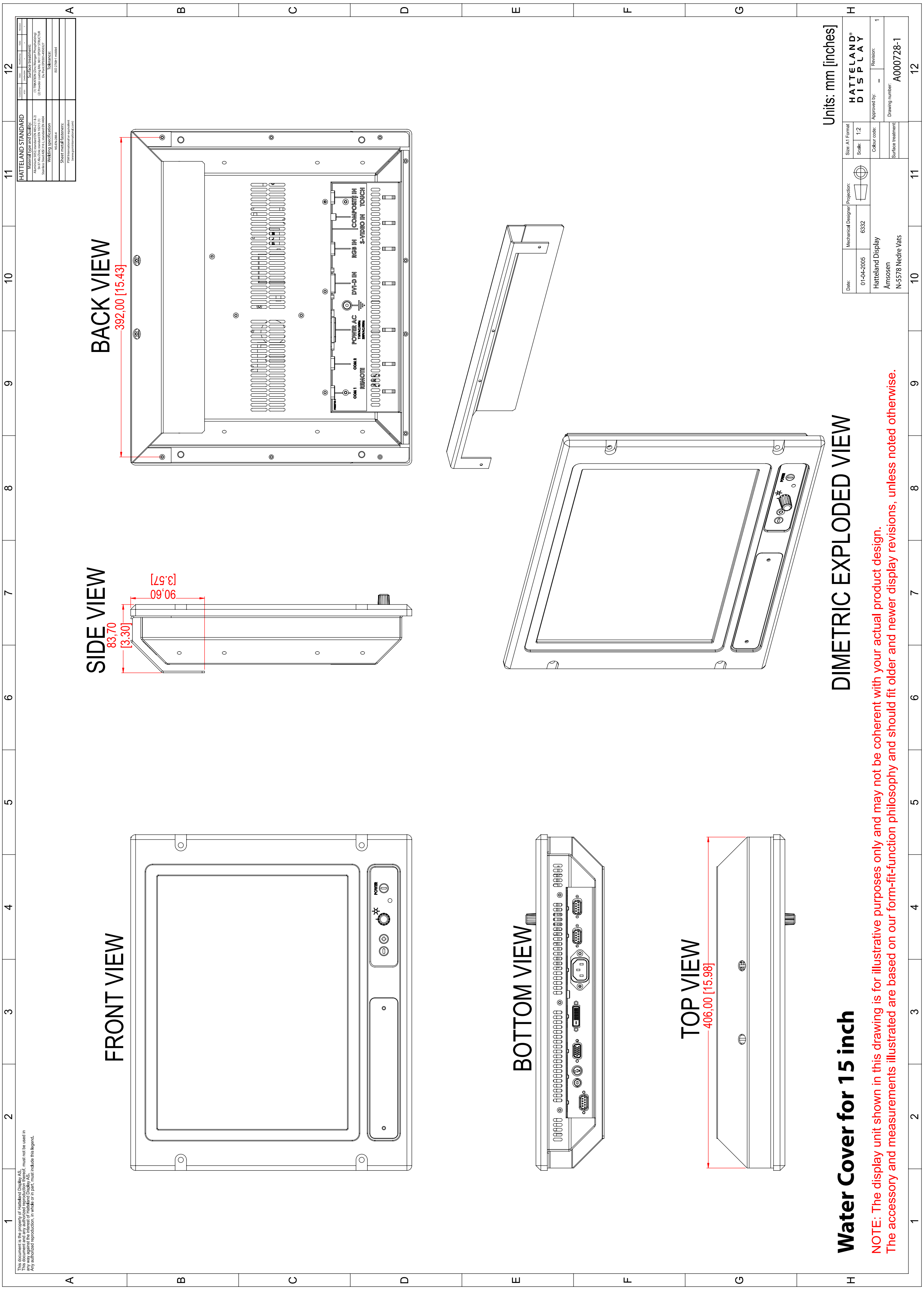
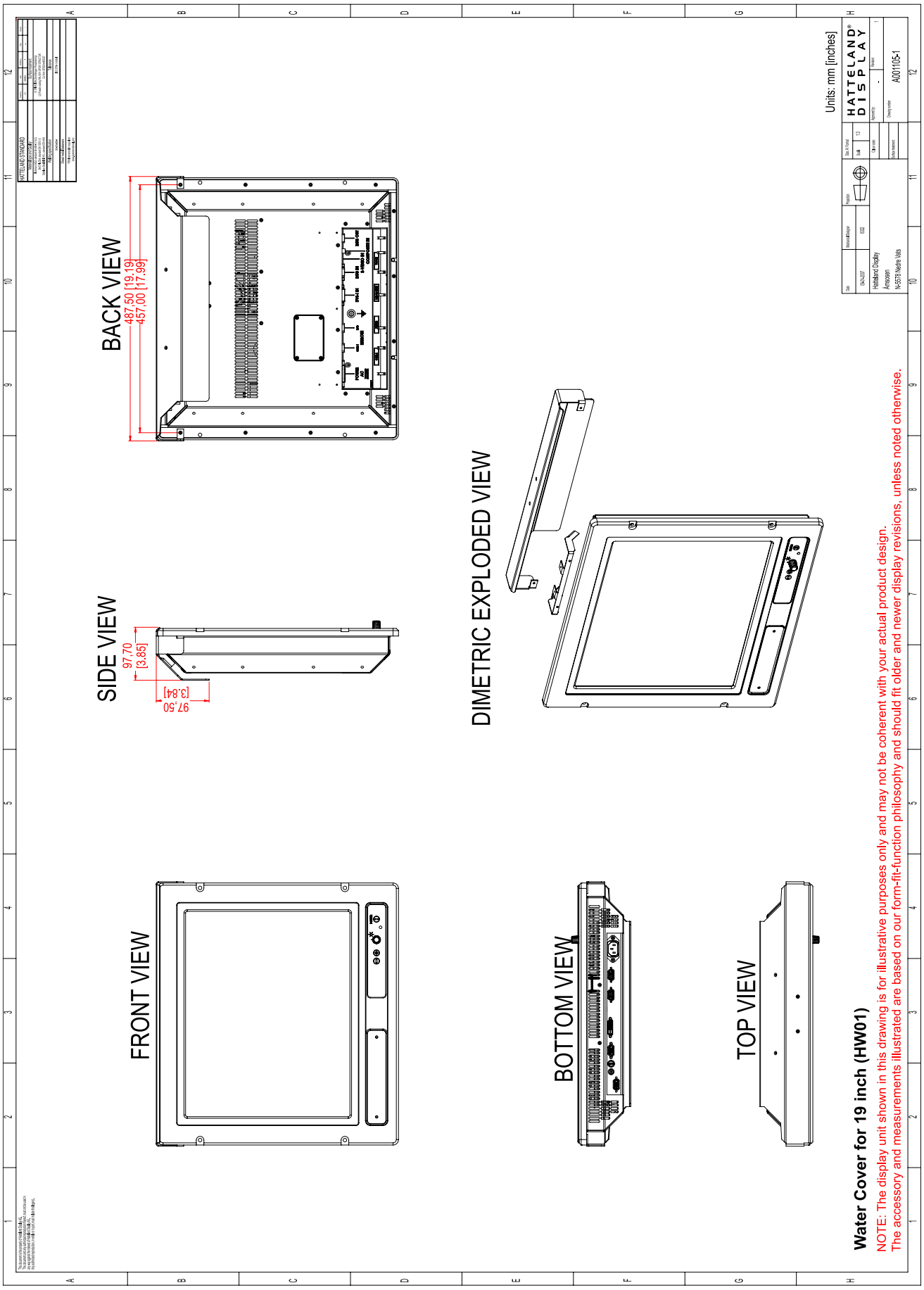
Technical Drawings - Accessories

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

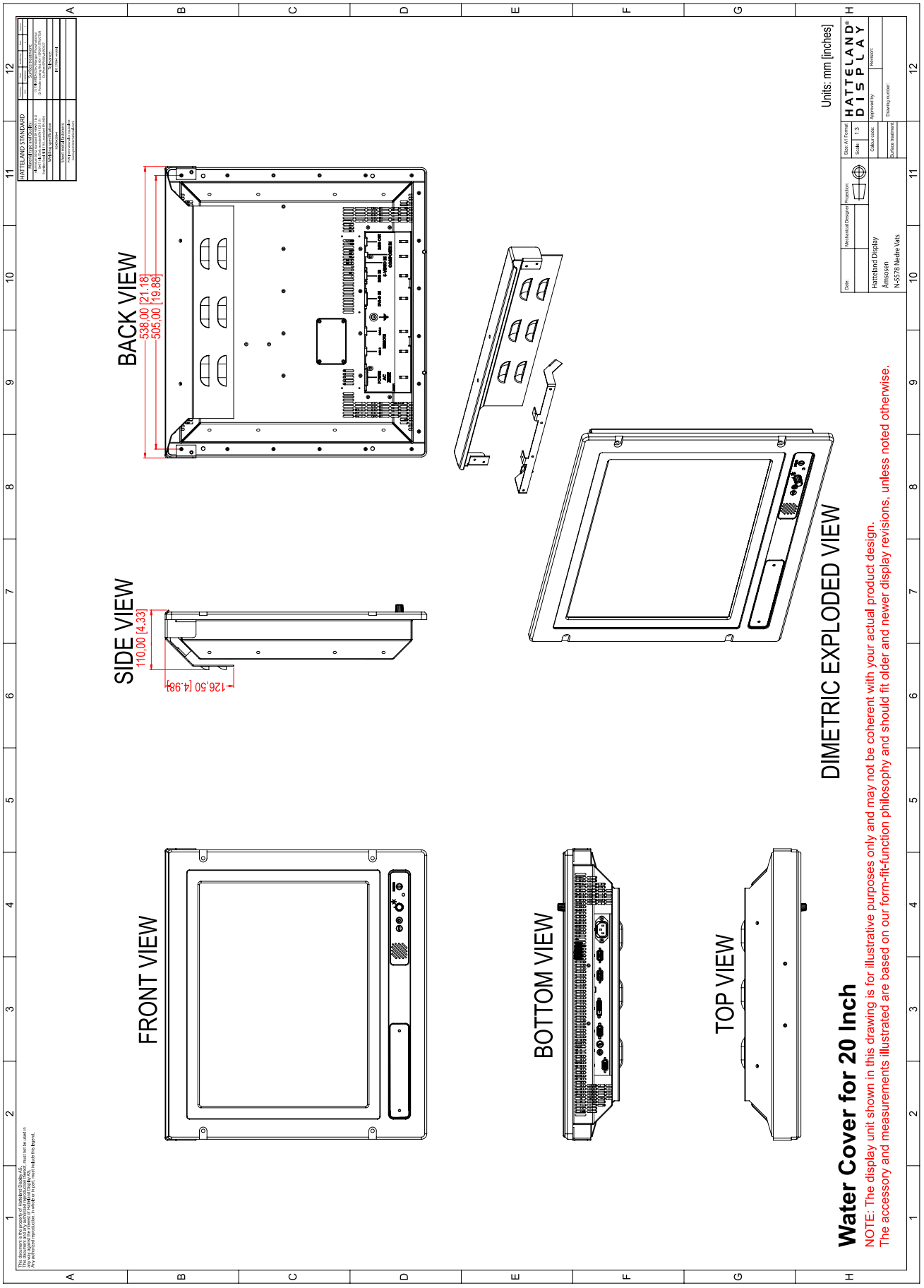


Technical Drawings - Accessories



Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

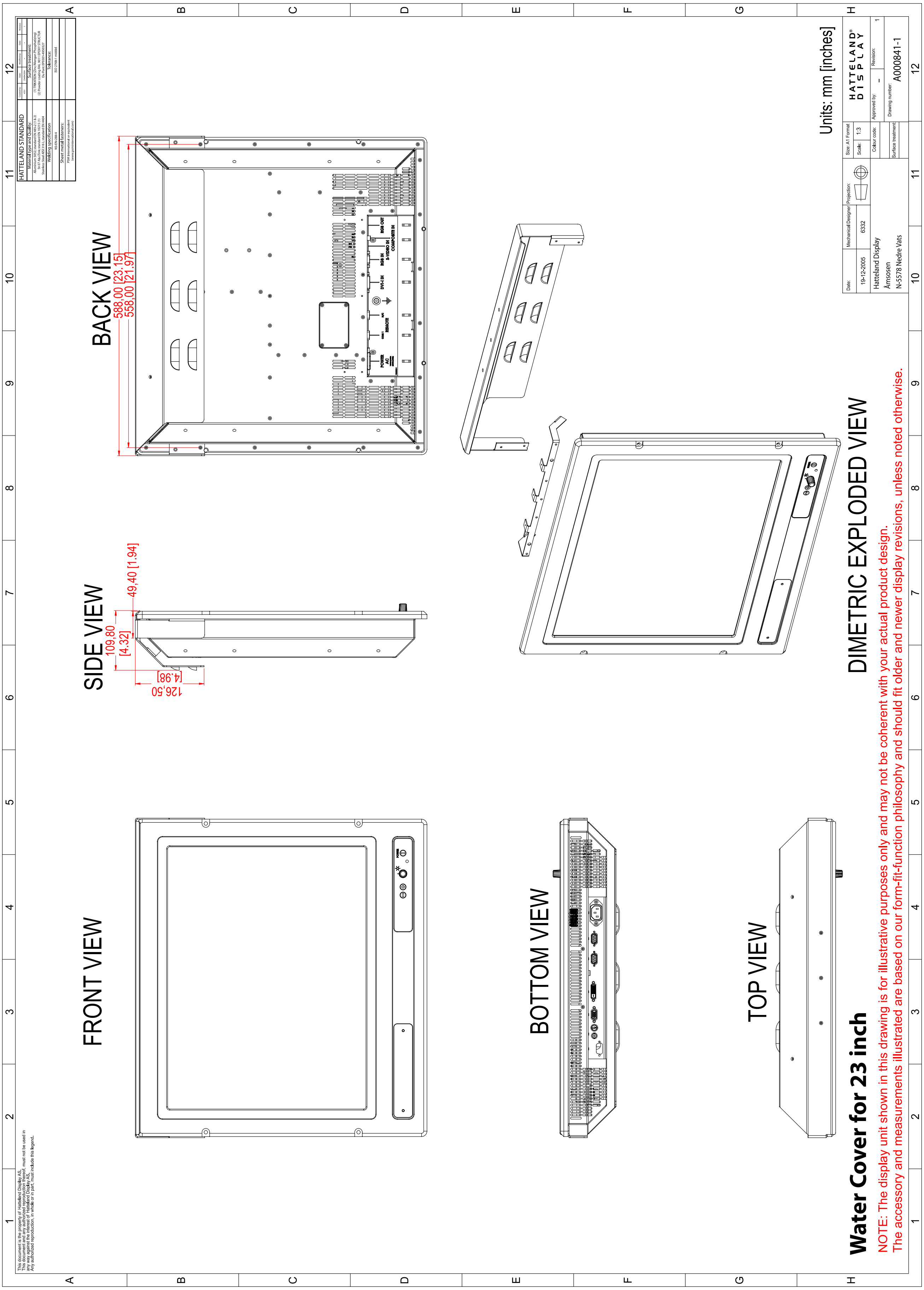
Technical Drawings - Accessories



Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - Accessories

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

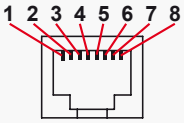


Appendixes

Pin Assignments - Common Connectors

Note: Not all connectors may be available on your specific product. This depends on the amount of additional hardware installed from factory, or customized solutions. These pin assignments are for the common connectors used. Connectors are seen from users Point Of View (POV).

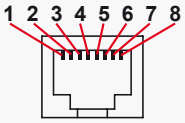
Pin Assignments - RJ45 10/100 LAN



Pin 01 - TDP	Transmit Differential Pair (Positive)
Pin 02 - TDN	Transmit Differential Pair (Negative)
Pin 03 - RDP	Receive Differential Pair (Positive)
Pin 04 - NC	Not Connected
Pin 05 - NC	Not Connected
Pin 06 - RDN	Receive Differential Pair (Negative)
Pin 07 - NC	Not Connected
Pin 08 - NC	Not Connected

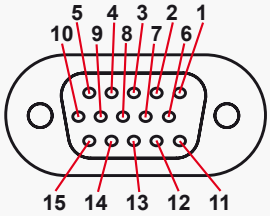
Use category 5 - twisted pair cable

Pin Assignments - RJ45 10/100/1000 GBLAN



Pin 01 - D0P	Differential Pair 0 (Positive)
Pin 02 - D0N	Differential Pair 0 (Negative)
Pin 03 - D1P	Differential Pair 1 (Positive)
Pin 04 - D2P	Differential Pair 2 (Positive)
Pin 05 - D2N	Differential Pair 2 (Negative)
Pin 06 - D1N	Differential Pair 1 (Negative)
Pin 07 - D3P	Differential Pair 3 (Positive)
Pin 08 - D3N	Differential Pair 3 (Negative)

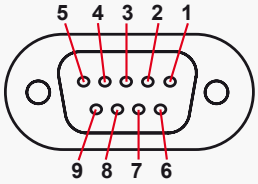
Pin Assignments - 15P HD RGB VGA



Pin 01	Red, analog
Pin 02	Green, analog
Pin 03	Blue, analog
Pin 04	Reserved for monitor ID bit 2 (grounded)
Pin 05	Digital ground
Pin 06	Analog ground red
Pin 07	Analog ground green
Pin 08	Analog ground blue
Pin 09	+5V power supply for DDC (optional)
Pin 10	Digital ground
Pin 11	Reserved for monitor ID bit 0 (grounded)
Pin 12	DDC serial data
Pin 13	Horizontal sync or composite sync, input
Pin 14	Vertical sync, input
Pin 15	DDC serial clock

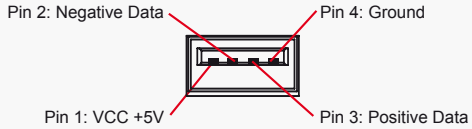
Pin Assignments - 9P Serial COM RS232

This connector is commonly used for:
Serial Remote Control Interface (SCOM) and
Touch Screen communication.

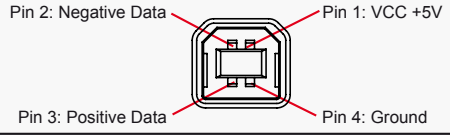


Pin 01 - DCD	Data Carry Detect
Pin 02 - SIN	Serial In or Receive Data
Pin 03 - SOUT	Serial Out or Transmit Data
Pin 04 - DTR	Data Terminal Ready
Pin 05 - GND	Ground
Pin 06 - DSR	Data Set Ready
Pin 07 - RTS	Request To Send
Pin 08 - CTS	Clear To Send
Pin 09 - RI	Ring Indicate

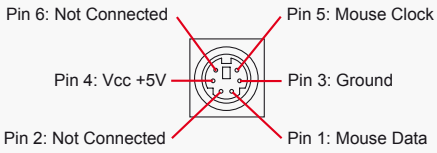
Pin Assignments - USB TYPE A



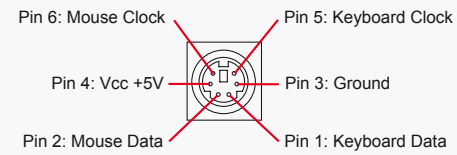
Pin Assignments - USB TYPE B



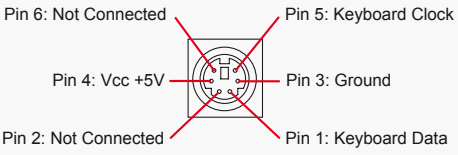
Pin Assignments - 5P PS/2 MOUSE



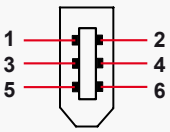
Pin Ass. - 5P PS/2 KEYBOARD+MOUSE Combined



Pin Assignments - 5P PS/2 KEYBOARD

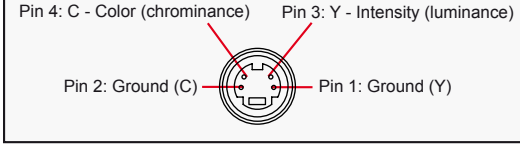


Pin Assignments - FIREWIRE IEEE-1394

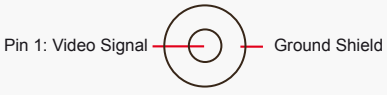


Pin 01 - VCC	Power
Pin 02 - GND	Grounding for power and inner cable shield
Pin 03 - TPB-	Twisted Pair B- Receive Strobe, Transmit Data
Pin 04 - TPB+	Twisted Pair B+ Receive Strobe, Transmit Data
Pin 05 - TPA-	Twisted Pair A- Transmit Strobe, Receive Data
Pin 06 - TPA+	Twisted Pair A+ Transmit Strobe, Receive Data

Pin Assignments - 5P S-VHS/S-VIDEO

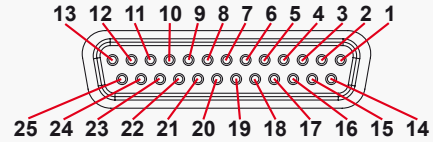


Pin Assignments - RCA/BNC 1P COMP. VIDEO



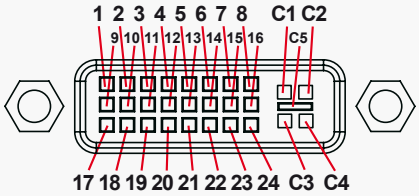
Pin Assignments - Common Connectors

Pin Assignments - 25P Parallel



Pin 01 - STROBE	This signal indicates to the printer that data at PD7..0 are valid.
Pin 02 - DATA0	Parallel data bus from PC board to printer. The data line are able to operate in PS/2 compatible bi-directional mode.
Pin 03 - DATA1	Same as Pin 02
Pin 04 - DATA2	Same as Pin 02
Pin 05 - DATA3	Same as Pin 02
Pin 06 - DATA4	Same as Pin 02
Pin 07 - DATA5	Same as Pin 02
Pin 08 - DATA6	Same as Pin 02
Pin 09 - DATA7	Same as Pin 02
Pin 10 - ACK	Signal from printer indicating that the printer has received the data and is ready to accept further data.
Pin 11 - BUSY	Signal from printer indicating that the printer cannot accept further data.
Pin 12 - PE	Signal from printer indicating that the printer is out of paper.
Pin 13 - SELECT	Signal from printer to indicate that the printer is selected.
Pin 14 - AUTO FEED	This active low output causes the printer to add a line feed after each line printed.
Pin 15 - ERR#	Signal from printer indicating that an error has been detected.
Pin 16 - INIT#	This active low output initialises (resets) the printer.
Pin 17 - SLIN#	Signal to select the printer sent from CPU board to printer.
Pin 18 - GND	Ground
Pin 19 - GND	Ground
Pin 20 - GND	Ground
Pin 21 - GND	Ground
Pin 22 - GND	Ground
Pin 23 - GND	Ground
Pin 24 - GND	Ground
Pin 25 - GND	Ground

Pin Assignments - 24P DVI-D & DVI-I



Pin 01	T.M.D.S. Data2 - (Digital - RED link 1)
Pin 02	T.M.D.S. Data2 + (Digital + RED link 1)
Pin 03	T.M.D.S. Data2/4 Shield
Pin 04	T.M.D.S. Data4 - (Digital - GREEN link 2)
Pin 05	T.M.D.S. Data4 + (Digital + GREEN link 2)
Pin 06	DDC Clock
Pin 07	DDC Data
Pin 08	Analog Vertical Sync (DVI-I only)
Pin 09	T.M.D.S. Data1 - (Digital - GREEN link 1)
Pin 10	T.M.D.S. Data1 + (Digital + GREEN link 1)
Pin 11	T.M.D.S. Data1/3 Shield
Pin 12	T.M.D.S. Data3 - (Digital - BLUE link 2)
Pin 13	T.M.D.S. Data3 + (Digital + BLUE link 2)
Pin 14	+5V Power (for standby mode)
Pin 15	Ground (for +5V and analog sync)
Pin 16	Hot Plug Detect
Pin 17	T.M.D.S. Data0 - (Digital - BLUE link 1) and digital sync.
Pin 18	T.M.D.S. Data0 + (Digital + BLUE link 1) and digital sync.
Pin 19	T.M.D.S. Data0/5 Shield
Pin 20	T.M.D.S. Data5 - (Digital - RED link 2)
Pin 21	T.M.D.S. Data5 + (Digital - RED link 2)
Pin 22	T.M.D.S. Clock Shield
Pin 23	T.M.D.S. Clock + (Digital clock + (Links 1 and 2)
Pin 24	T.M.D.S. Clock - (Digital clock - (Links 1 and 2)
Pin C1	Analog RED
Pin C2	Analog GREEN
Pin C3	Analog BLUE
Pin C4	Analog Horizontal Sync.
Pin C5	Analog Ground (return for RGB signals)

DDC = Display Data Channel /// T.M.D.S = Transition Minimized Differential Signal /// PIN C1,C2,C3,C4 = Only present on DVI-I connectors.
NOTE: Connector shows a DUAL LINK design, but some units may not support it. Only products with 1920x1200 or more in resolution require / support DUAL LINK.

Additional connector pinouts may be available in third party motherboard manuals, primarly for computers only. Please see manual/drivercd delivered with your product.

Basic Trouble-shooting

GENERAL ISSUES FOR TFT PANEL BASED PRODUCTS

Note: Applies for a range of various products. This is only meant as a general guide.

NO PICTURE / LED BEHAVIOUR:
If there is no light at all in the LED at the FRONT, check power cables. If the LED in front is green then check if the brightness knob is turned to the right (max brightness). If still no picture, check if there is a VGA signal on the External VGA connector. If you have a picture on the external VGA connector please look in BIOS documentation/chapter for correct display settings in BIOS. Lack of image is most likely to be caused by incorrect connection, lack of power, or wrong BIOS settings.

SCROLLING / UNSTABLE IMAGE:
Signal cable may not be completely connected to computer or TFT display. Check the pin assignments and signal timings of the display and your video card with respect to recommended timing and pin assignments. Make sure that the video card is compatible and that it is properly seated / installed on the computer.

DISPLAY AREA IS NOT CENTERED / SIZED CORRECTLY
Make sure that a supported video mode has been selected on the display, or on the video card / system. If it is impossible to position the image correctly, i.e. the image adjustment controls will not move the image far enough, then test it again using another graphics card for the PC system. This situation may occur with a custom graphics card that is not close to standard timings or if something is in the graphics line that may be affecting the signal, such as a signal splitter (please note that normally a signal splitter will not have any adverse effect). If it is impossible to change to the correct resolution/color depth, check if you have the right VGA driver installed in your system.

IMAGE APPEARANCE:
A faulty TFT panel can have black lines, pixel errors, failed sections, flickering or flashing image.
Incorrect graphics card refresh rate, resolution or interlaced mode will probably cause the image to be the wrong size, it may scroll, flicker badly or possibly even no image is present. Sparkling on the display may be a faulty TFT panel signal cable, and it needs service attention.

RGB Signal Only: Horizontal interference can usually be corrected by adjusting the PHASE (OSD menu).
Vertical interference can usually be corrected by adjusting the FREQUENCY (OSD menu).

DEW CONDENSATION BEHIND GLASS:
Note that this problem will not occur on bonded products. For non-bonded products, do the following:
Power on the TFT product and set brightness to 100%. Turn off any automatic screensavers on PC or similar. During minutes the dew will be gone. To speed up the process, use a fan heater for a reasonable time. Do not overheat the TFT product.

GENERAL ISSUES FOR COMPUTER BASED PRODUCTS

Note: Applies for a range of various products. This is only meant as a general guide.

CD-ROM FAILURE OR READ/DETECTION PROBLEMS:
If the product are operated/located in a area with extreme condensation, the CD/DVD drive may not work correctly due to condensation on the read head. Keep the product on for a while until it's reached normal operating temperature, and retry accessing discs. Otherwise, consider using USB memory sticks or alternative storage devices.

NO CD-ROM AVAILABLE ON YOUR PRODUCT FOR INSTALLING DRIVERS/SOFTWARE:
Please use USB memory sticks, USB Floppy drive, USB CD-Rom Drive or alternative storage devices to transfer/install software on CD-ROM-less units.

HATTELAND®
DISPLAY

Declaration of Conformity

We, manufacturer

Hatteland Display AS
Åmsosen, N-5578 Nedre Vats, Norway

declare under our sole responsibility that the JH MMD, JH MMC, JH STD, JH MIL, HM NMD HM MIL, HT STD, HD MMD & HT MMC product ranges is in conformity with the following standards in accordance with the EMC Directive.

Low Voltage Directive 2006/95/EC
EN 60950

EMC Directive 2004/108/EC
EN 55022 Class A
EN 55024

Signature:.....
Knut Vidar Lauritsen
President
Nedre Vats, Norway

Signature:.....
Arne Kristiansen
Site Manager - Test & Commission Division
Oslo, Norway

Date: 04 Apr 2008

CE

Return Of Goods Information

Return of goods: (Applies not to warranty/normal service/repair of products)
Hatteland Display referenced as “manufacturer” in this document.

Before returning goods, please contact your system supplier before sending anything directly to manufacturer. When you return products after loan, test, evaulation or products subject for credit, you must ensure that all accessories received from our warehouse is returned. This applies to cables, powermodules and additional equipment except screws or similar, user manual, datasheets or other written paper documents. Furthermore, the product must not have any minor / medium or severe scratches, chemical spills or similar on the backcover, front frame or glass.

This is needed to credit the invoice 100%. Missing parts will not be subject for credit, and you will not get total credit for returned product. You will either be charged separately or the amount is withdrawn from the credit. If you decide to ship the missing items on the after hand, you will get 100% credit for that particular invoice or items received at manufacturer incoming goods control. Please contact our service/sales department if additional questions

Approved packaging methods/materials: (Applies to all shipments to manufacturer)
When returning goods, please make sure you surround the product with the following material, whenever possible: Original packaging from manufacturer, firm foam material, bubble wrap or lots of PadPack paper or Foam chips/polyester wrapped in sealed plastic bags. In any case, always use a solid cardboard box to surround everything.

Not approved packaging methods/materials are: Foam chips, expanded polyester, clothes, nothing, or too little, or anything that will crumble and get into the ventilation holes of products and cardboard boxes that are not suitable to secure the product during shipment.

Terms

Terms Of Sale And Delivery

1) APPLICATION
The terms of sale and delivery apply for Hatteland Display.

2) PRICE

a) The price is per each, if nothing else has been stated, VAT not included. Price is based on the prices from our suppliers, current custom rates, taxes, rate of exchange and international raw material prices. We reserve ourselves the rights to adjustments in case of alternation on the above mentioned.

b) Included in the price is the supplier's standard packing. In case of re-packing/smaller quantities we reserve ourselves the right to add an additional sum for warrantable packing according to CECC 0015 (Basic inspection for protection of electrostatic sensitive devices)

3) VALIDITY
If nothing else has been stated in our quotation, the offer is valid for 30 days from the date of quotation.

4) PACKAGE QUOTATION
A package quotation means that all the components offered, must be ordered by us. If one component or more are removed from the quotation, the prices given in the package quotation are not valid.

5) TERMS OF PAYMENT
Cash on delivery or payment in advance. Net granted for companies, schools and institutions only, according to agreement. In case of too late payment 1.5% interest/month will be charged. Seller has mortage rights in the goods delivered until the purchase price, additional interests and charges have been paid in full. Accepted bill is not considered as payment until it has been honoured in full.

6) TIME OF DELIVERY
The quoted time of delivery is based on information from our suppliers. We disclaim any responsibility for the consequences of any delay or cancellation from our suppliers. Belated delivery gives not solely the right for cancellation.

7) DELIVERY POINT OF TIME
Goods are considered delivered to customer when handed over to charterer.

8) FREIGHT / PACKING / FORWARDING FEE
Hatteland Display AS charge NOK 50,- in forwarding fee for orders below NOK 1000,-.
Freight charge according to expenses for orders above NOK 1000,-. VAT not included.

9) COMPLAINT
By receipt customer must check goods for obvious defects which have to be claimed within 8 days from receipt. Otherwise acceptance of complaint can not be counted on.

10) GUARANTEE / SERVICES
Time of guarantee is calculated from our date of shipment, and applies to the extent that we are covered by our supplier's guarantee regulations. The guarantee does no longer apply if:

I) there has been encroached upon the goods without seller's consent
II) terms of payment is not fulfilled
III) the goods have been damaged due to unskilled treatment
IV) components which are sensitive for static electricity have not been unpacked and treated in a secure way.

Minimum requirements: CECC 00015's standards for handling of such components. The guarantee does not include fair wear and tear.

11) RESPONSIBLITY
Seller undertake to deliver faultless and functional capable goods according to existing technical specifications. Seller disclaim responsibility for any damage or loss which directly or indirectly may be caused due to failure or defect with the delivered goods, if carelessness from the seller can be limited up to the cost of the goods. The supplier's responsibility for defects with the supplied goods do not include secondary damage or loss.

Terms

12) CANCELLATION / RETURN
Binding sales contract is concluded when we have confirmed customer's purchase order. Any disagreements in our order confirmation must be reported to seller within 6 days. The agreement can not be altered without our permission, after acceptance from our supplier. If goods are wanted to be returned, a Return No must be assigned from seller. Returned goods without a Return No will not be accepted. By return of stock listed goods, 20% return fee is charged. Returned goods are shipped on customer's account and risk.

13) LOAN, RENT and DEMO
When borrowing of goods for demo/test, the date of return must be added to the document. If no date has been stated, date of return is two weeks from the date of the document. Before return, seller must be contacted for a Return No (RTK). Goods which have been sold with an agreed right of return within stated terms, shall also have a Return No. The Return No must be obtained before the stated date of return. Returned goods without a Return No, or which have not been packed in original packing, will not be accepted.

14) LIMITATIONS
If any of our suppliers claim limited delivery terms towards us, our terms of delivery will be restricted according to those.

15) SOFTWARE
Sold or borrowed software is not allowed to be copied or spread in other ways, without a written permission.

16) RE-EXPORT
Goods delivered from seller may be subject to special rules of exportation in their supplier's native country. Buyer is responsible to obtain necessary permissions for further export/re-sale.

17) QUESTION IN DISPUTE
To settle any dispute the Karmsund Herredsrett is approved the legal venue.

INSTRUCTIONS FOR THE CONSIGNEE

1) CONTROL
Control the goods immediately by receipt. Examine the quantity towards the invoice/packinglist/shipping documents. Look for outward defects on the packing which may indicate damage on or loss of contents. Control the container and the seals for any defects.

2) SECURING EVIDENCE
When defects on the goods have been found, evidence must be secured, and seller must be informed. Call the transporter and point out the defects. Add a description of the defects on the goods receipt, the forwarder's copy of the way-bill or on the driving slip.

3) RESCUE
Bound the damage. Try to restrict the damage and the loss. Seller will compensate expences incurred due to reasonable security efforts in addition to damage and loss.

4) COMPLAINT
Write immediately a complaint to the transporter or his agent. Forward immediately the complaint to the transporter or his agent, and hold the transporter responsible for the defects. The complaint must be sent at the latest:

- for carriage by sea: within 3 days
- for overland / air transportation within 7 days

5) DOCUMENTATION
For any claims the following documentation is required, and must be forwared to the company or their agent: invoice, way-bill and/or bill of landing, and/or statement of arrival, inspection document, besides a copy of the letter of complaint to the transporter.

Pixel Defect Policy

PIXEL DEFECT POLICY

Dot-defects (Bright or dark spots on the panel)

Due to the effect that dot failures are part of the TFT technology such failure occurrence cannot be prevented basically. Even though dot defects usually occur during production process, new defects can appear within the lifespan of a TFT display. Neither the production at LCD-supplier nor the use of a LCD-Monitor after shipment can be influenced by Hatteland Display. Hence Hatteland Display cannot be made responsible for such dot failures. However Hatteland Display understand and accepts the responsibility towards the customers for the delivery of new displays, therefore accepts a limitation on dot defect's occurrence on new displays delivered to the customer.

PRINCIPLES

a. One pixel consists of 3 dots (Red, Green and Blue)

b. Dot defects are differentiated between:
- Bright dot defects: Spot on the panel appear as pixels or sub pixels that are always lit. Non-extinguishing dot.
- Dark dot defects: Spot on the panel appear as pixels or sub pixels that are always dark (off). Non-lightening dot.

c. Inspector observes the LCD from normal direction at a distance of 50cm above the worktable. Dark dots are counted under entire white screen. Bright dots are counted under entire black screen.

d. Dot failures within tolerances below do not qualify for warranty claims.

PIXEL DEFECT TOLERANCES

Bright dot	≤ 4 dots
Two adjacent bright dots *	≤ 2
Distance between 2 dot defects *	≥ 15mm
Dark dots	≤ 8
Total number of bright or dark dot defects. *	≤ 8

* 1 or 2 adjacent dot defects considered as 1 defect.

EXTRAORDINARY CIRCUMSTANCES

Possible cases which cannot be influenced either by customer or Hatteland Display.

Examples for extraordinary circumstances:
- Allocation from LCD-Supplier
- Outstanding high number of LCD-panels with bright dots but within LCD-suppliers Specification.
- Sharply increased demand by customer

In such cases a mutual agreement is inevitable.

Examples:
- Acceptance of bright dots in "non-critical" display areas.
- Acceptance of bright dots with defined color.

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Notes

General Notes:

- The unit is type approved according to EN60945 (1997), 4.4, equipment category b) protected from the weather.

- Use of brightness and push buttons may inhibit visibility of information at night.

Notes

Revision History

Rev.	By	Date	Notes
0	SE	05 Oct 07	First release, preliminary for prototypes and internal reviews.
1	SE BUL KEO	06 Feb 08	Commercial final release 1
2	SE	07 Apr 08	Revised contents of package chapter (US power cable and console mounting screws added). Revised company profile and company logos throughout manual. Added illustrations and info for DC models (own dedicated housing connector with screw terminal). Revised specifications (environmental considerations). Added 19 inch watercover drawing (HW01). Added note to all accessories drawings (display model is illustration only)
3	SE	15 Jul 2008	Specifications revised: Type approval DNV and BV, Q2 2008 changed to Q4 2008 for potmeter Added Compass Safe Distance for 23 inch.
4	SE PL AK	06 Oct 2008	Added JH 27T11 MMD specifications and technical drawings. Added JH 20T17 MMD specifications and technical drawings. Type approval (ABS and GL) added to specifications where applicable. Replaced JH 15T15 MMD with JH 15T17 MMD. Replaced JH 19T12 MMD with JH 19T14 MMD. Added accessory drawings for 20 inch. Added info about minimum viewing distance. Revised PIP size information.
5	SE	16 Oct 2008	Added JH 15T15 MMD and JH 19T12 MMD as they are available throughout 2008. Added inches to technical drawings and specifications where needed. Revised specifications for 27 inch.
6	SE	13 Nov 2008	Updated JH 23T12 MMD drawing to show buzzer+potmeter functionality. Revised general chapter.

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