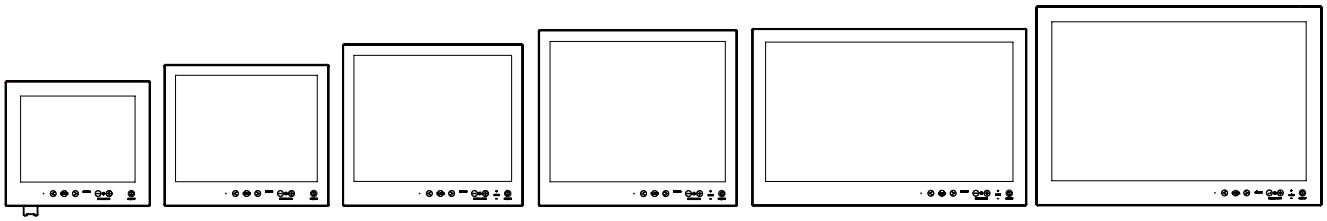
HATTELAND®
DISPLAY

USER MANUAL



Series X - Maritime Multi Display (MMD) Models

HD 12T21 MMD-xxx-Fxxx - 12.1 inch Maritime Multi Display
HD 15T21 MMD-xxx-Fxxx - 15.0 inch Maritime Multi Display
HD 17T21 MMD-xxx-Fxxx - 17.0 inch Maritime Multi Display
HD 19T21 MMD-xxx-Fxxx - 19.0 inch Maritime Multi Display
HD 24T21 MMD-xxx-Fxxx - 24.0 inch Maritime Multi Display
HD 26T21 MMD-xxx-Fxxx - 25.54 inch Maritime Multi Display

User Manual MMD Series X	
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Please visit www.hatteland-display.com for the latest electronic version of this manual.

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WARNING: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Last revised 6 Jan 2015

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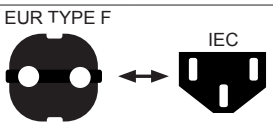
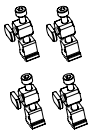
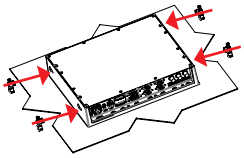
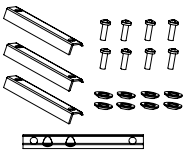
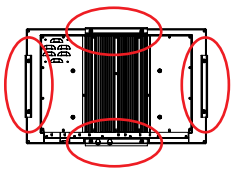
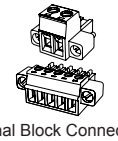
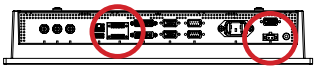
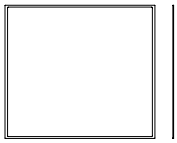
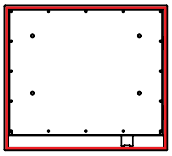
Contents of package

Note: Entries listed below are for Standard factory shipments. Customized factory shipments may deviate from this list.

Item	Description	Illustration
 HA-SDM-2M	1 pcs of Standard DVI Signal Cable. DVI-D 18+1P Male to DVI-D 18+1P Male Single Link - Length 2.0m	
 HA-VGA-2M-32	1 pcs of Standard VGA Signal Cable. DSUB 15P Male to DSUB 15P Male - Length 2.0m	
 FS-CABLE EU	1 pcs of power cable European Type F “Schuko” to IEC. Length 1.8m *Note: Included in package for models with AC input.*	
 80099	1 pcs of power cable US Type B plug to IEC. Length 1.8m *Note: Included in package for models with AC input.*	
 MEDIA STD01	Documentation and Driver DVD/CD containing the user manual, including the Touch Screen driver for units delivered with a factory mounted touch screen. For most recent drivers, please visit “www.hatteland-display.com/archive” In some cases (due to revisions) a provisonal CD (PRO02-xxx) may be delivered with the unit instead.	 Menu browser for Microsoft® Windows® Operating Systems
	Test Report	
 HD CMB SX1-A1 or HD CMB SX1-A2	Model Dependent: 4 pcs of Key Hole Mounting Brackets for Console/Panel Mounting, Anodized Aluminium/Stainless Steel. The bracket kit is suitable for 12, 15, 17 and 19 inch units and is EN60945 Tested. Note: Either -A1 or -A2 version may be delivered during Q4-2014 to Q1-2016 Reference: http://www.hatteland-display.com/mails/02_2015_ecn.html -A1: Suitable for panel thickness 3.0 [0.12] to max: 12.00 [0.47] mm [inch] -A2: Suitable for panel thickness 1.0 [0.04] to max: 12.75 [0.50] mm [inch]	
 HD CMB SX1-B1 or HD CMB SX1-C1	Model Dependent: Bracket Kit suitable for console/panel mounting which contains: 3 x Mounting Bracket for top, left and right side 1 x Mounting Bracket for bottom side (terminal/connector plate area) 8 x M5x16 screws 8 x C-Washers HD CMB SX1-B1 = Suitable only for 24 inch units and is EN60945 Tested. HD CMB SX1-C1 = Suitable only for 26 inch units and is EN60945 Tested.	
 Terminal Block Connector Kit	Terminal Block Connector Kit as follows (may in some cases be already factory mounted): 1 x 2-pin Terminal Block 5.08 for DC Power In 2 x 5-pin Terminal Block 3.81 for RS-422 / RS-485 / SCOM / Buzzer Module Refer to “Configuring Housing / Terminal Block Connector” section for usage.	 Note: Location of module(s) may differ between unit sizes

Package may also include:

Item	Description	Illustration
 USB-8	1 pcs of Touch Screen Cable USB Type A to Type A. Length Approx 2m. *Only included in package if model is equipped with factory mounted Touch Screen*	
	For High Bright / Sunlight Readable models (12-24 inch) an EPDM sealing gasket for IP66 console mount is factory pre-mounted / included with delivery. Details / Type number reference: Surface: RAL9011, Glue: 3M9471LE, Thickness 2mm. P006998-1 (12), P006997-1 (15), P007130-1 (17), P007131-1 (19), P007032-1 (24)	

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General

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 at the end of the manual.

Furthermore, for third party datasheet and user manuals, please see dedicated Documentation and Driver DVD delivered with the product or contact our sales/technical/helpdesk personnel for support.

About Hatteland Display

Hatteland Display is the leading technology provider of specialized display and computer products, delivering high quality, unique and customized solutions to the international maritime, naval and industrial markets.

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 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.

www.hatteland-display.com

You will find our website full of useful information to help you make an informed choice as to the right product for your needs. You will find detailed product descriptions and specifications for the entire range on Displays, Computers and Panel Computers, Military solutions as well as the range of supporting accessories. The site carries a wealth of information regarding our product testing and approvals in addition to company contact information for our various offices around the world, the global service centers and the technical help desk, all ensuring the best possible support wherever you, or your vessel, may be in the world.

Contact Information

Head office, Vats / Norway: Hatteland Display AS Stokkastrandvegen 87B N-5578 Nedre Vats, Norway Tel: +47 4814 2200 mail@hatteland-display.com	**Sales office, Frankfurt / Germany:** Hatteland Display GmbH Werner Heisenberg Strasse 12, D-63263 Neu-Isenburg, Germany Tel: +49 6102 370 954 Fax: +49 6102 370 968
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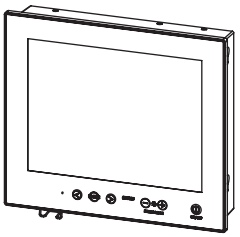
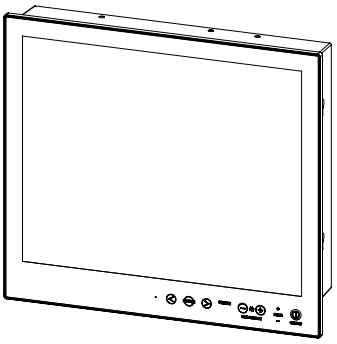
Sales office, Vista / USA: Hatteland Display Inc 380 South Melrose Drive, Suite 349 Vista, CA 92081 USA Tel: +1 760-643-4061 Fax: +1 858-408-1834	

For an up-2-date list, please visit www.hatteland-display.com/locations

Maritime Multi Display (MMD) - Introduction

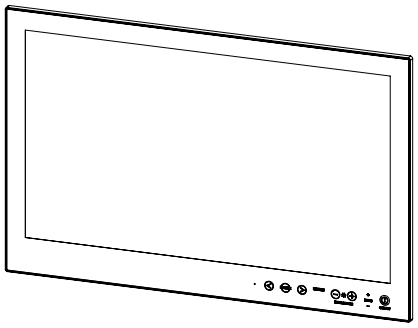


As a leading manufacturer of display and computer hardware for the maritime segment, Hatteland Display continuously gauges and responds to market needs. Our commitment to develop specialized products for a multitude of onboard ship systems continues, and with that the introduction now of a brand new product range called, Series X.



With cast aluminium, compact and sleek by design chassis, the units from this new range can be desk mount or console integrated. The design is modular, allowing for common modules to be used in various models and combinations. Together these design features bring about a range perfectly in synch to market cost expectations - along with that, the performance and type approval always expected in all Hatteland Display products.

The modules used in Series X, are all qualified having undergone and passed our extensive test program, which includes HALT testing. This means that the products are tested well outside the requirements in EN60945 and E10. The result is a more reliable product.



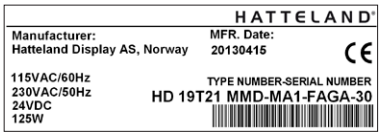
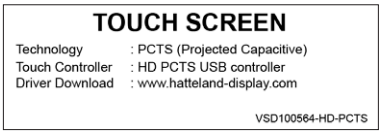
- MULTITOUCH
- TYPE APPROVED
- ECDIS COMPLIANT
- IP22 REAR / IP66 FRONT
- SUPERIOR BONDING TECHNOLOGY
- MODULE BASED, TAILOR-MADE SYSTEMS MADE EASY!
- SUNLIGHT READABLE / HIGH BRIGHT VERSIONS AVAILABLE
- GLASS DISPLAY CONTROL™ (GDC), SOLID STATE MENU SYSTEM

Product Labeling

Introduction

This section details the locations, content details and specifications for factory mounted labels for all currently available standard Hatteland Display Maritime Multi Display (MMD) models. This information will in most cases also apply for most Customized Models as well, but may differ based on customer requirements, in that case, please refer to the customized User Manual (paper or electronic version, dependent on customer requirements).

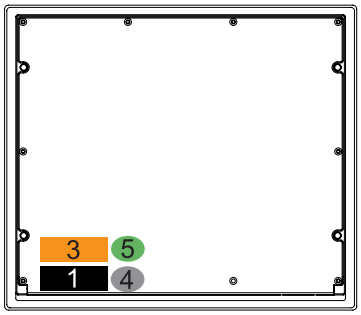
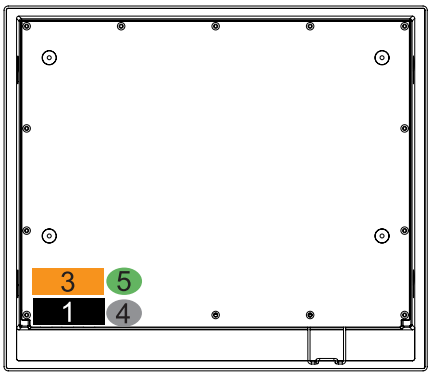
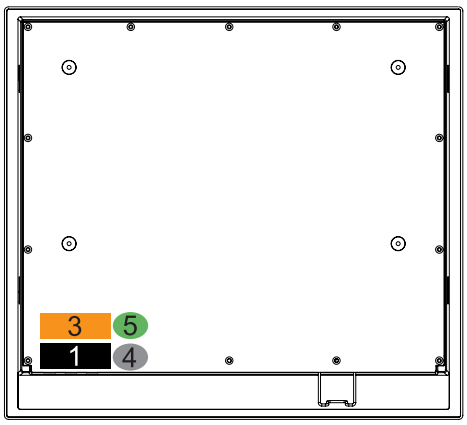
Label Size and Types

ID	Label Layout	Description	Specification
1		**Type : Serial Number Label** **Name :** Label B **Size :** 60mm wide x 22mm high (rectangle size) Note: Text content of label will match specifications derived from Data Sheet.	Silver with glue on back, non-tearable and made for thermal transfer printing.
		Barcode type: CODE128 (used extensively world wide in shipping and packaging industries. The symbology was formerly defined as ISO/IEC 15417:2007.)	
3		**Type : Touch Screen Label** **Name :** Label B **Size :** 60mm wide x 22mm high (rectangle size) Note: Only present if Touch Screen was part of factory option order.	Silver with glue on back, non-tearable and made for thermal transfer printing.
		Note: Content on label will vary based on Touch Screen type and/or Touch Screen Controller. Label shown to the right is for illustration purposes only!	
4		**Type : Warranty Label** **Size :** 30mm wide x 23mm high (oval size)	Tampering proof sticker with glue on back.
5		**Type : Quality Control (QC) Label** **Size :** 30mm wide x 23mm high (oval size)	Ordinary sticker with glue on back.

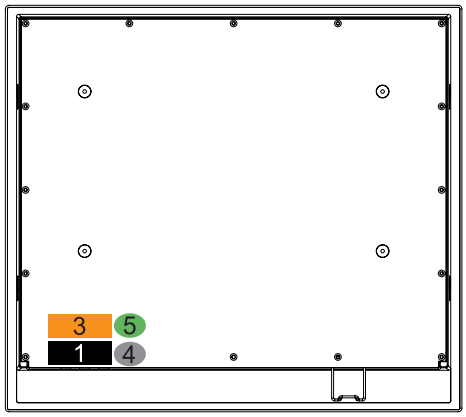
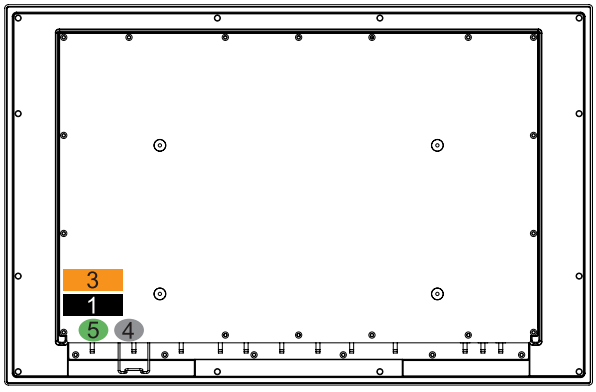
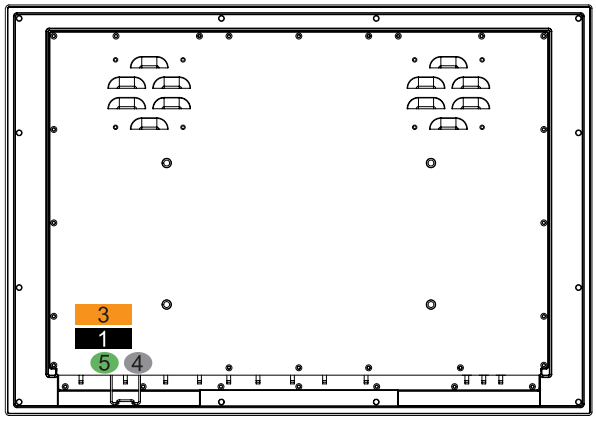
Product Labeling

Label Locations

Number ID and coloring based on “Label Size and Types“ table from previous page. All illustrations below is seen from rear (and side where needed) with connectors facing down. Actual labels regarding its size and text orientation vs product size is drawn in. Due to space restrictions on selected units, some labels will be rotated 90 degrees to fit properly. The arrangement of labels may be shifted/stacked differently as it is based on factory options, such as; Touch Screen, but they will be grouped together where possible.

Label Positions	Notes	Applies for Product Range
	Warranty label covers screw. Labels placed on rear.	**HD 12T21 MMD-xxx-Fxxx**
	Warranty label covers screw. Labels placed on rear.	**HD 15T21 MMD-xxx-Fxxx**
	Warranty label covers screw. Labels placed on rear.	**HD 17T21 MMD-xxx-Fxxx**

Product Labeling

	Warranty label covers screw. Labels placed on rear.	**HD 19T21 MMD-xxx-Fxxx**
	Warranty label covers screw. Labels placed on rear.	**HD 24T21 MMD-xxx-Fxxx**
	Warranty label covers screw. Labels placed on rear.	**HD 26T21 MMD-xxx-Fxxx**

Product Labeling

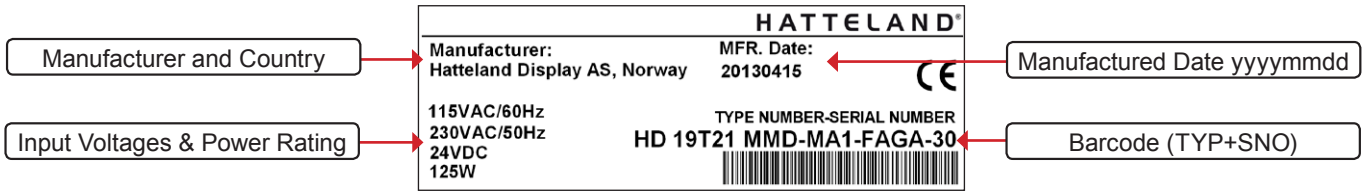
Warranty Label

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.

Serial Number Label Layout (example)



Introduction to products with touch screen

Nearly all of our Series X products with touch screen uses Projected Capacitive Touch screen (PCTS), widely used with great success on mobile phones and typical pad devices. PCTS can be equally effective also for marine applications. One of the advantages of PCTS is that it has features seen in both resistive and surface capacitive touch screen technologies.

Multitouch is defined as the ability to recognize two or more simultaneous touch points. Using projected capacitive technology lets us create a more intuitive form of human-device interaction. Touch interface gestures, supported by projected capacitive sensors, can simplify the interface and provide an intuitive user experience that goes beyond the typical "button replacement" found in most simple touch interfaces.

Please review the appropriate Product Data Sheet (in this manual) to determine if PCTS are supported.

The technical benefits of PCT are:
- Very good optical performance (same as surface capacitive)

- Environmentally strong, the touch sensor is inside the product (better than both surface capacitive and resistive)

- Supports Multitouch (Newer Operating System (OS) required in most cases.

- Excellent readability - light transmission of up to 91% through a standard sensor

- Stability - no drift, therefore no recalibration is required

- Pointing device - works with gloved and ungloved finger

- Resistance to contamination - by harsh cleaning fluids and other noxious substances

- Communicates via USB to external computer or internally

Comparisons between general Touch Technologies used by Hatteland Display:

Technology	Optical Performance	Stable Calibration	Gloves	Water	Durability	Price	Multitouch
Analog Resisitive	- -	+	+ +	+ +	-	+ +	-
Surface Capacitive	+ +	-	- -	-	+	-	-
Projected Capacitive	+ +	+ +	+	+ *	+ +	+	+ +

*Projected Capacitive (PCTS) / Water: Touch Screen Glass Surface can withstand drip and direct rain, but expect reduced capability, detection and performance if unit are exposed to these factors while powered. Hatteland Display recommends to protect the unit from direct rain or drips if critical touch operations are to be performed. Take nessessary steps (if detected or suspected) within the installation environment to prevent accidental touch gestures or presses not performed intentionally by a human operator.

Touch Screen Drivers and Documentation

All units are shipped with a Documentation and Drivers DVD or CD which contains suitable drivers* for touch screens. (Named MEDIA STD01).

You can also visit our website www.hatteland-display.com/archive to view the same list (or even recently new added products) for 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.

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

***General Note:**
Newer Operating Systems (OS), from year 2011 and above, does not specifically require additional 3rd party drivers in order to operate the touch screen and support “Multitouch”. For example; Microsoft® Windows® 7 and above comes with default factory installed Windows HID drivers fully supporting “Multitouch”. You may choose to install 3rd party drivers for example during trouble-shooting situations or to review features of the 3rd party software. Hatteland Display suggests that you should use factory default Microsoft® Windows® 7 HID touch drivers in any case possible.

For older Operating Systems (like Microsoft® Windows® XP and older), before year 2011, the OS does not not support “Multitouch” technology and the touch screen will just operate as a ordinary single-point touch screen. Additionally to get touch screen working at all in older OS, you need to install 3rd party drivers.

Note that the lack of “Multitouch” support is not dependent on hardware or software/firmware for the controller specifically, but rather dependent on important core functions in the Operating System which are outside control of the 3rd party software.

Summary

Microsoft® Windows® XP
- 24 and 26 inch HD xx21 units:
- Please use Touch Screen Driver Wizard and install PCT Touch Utility, example PtouchUtility-1.0.0.4-150326.exe.
  Reference August 2015: http://www.hatteland-display.com/mails/21_2015_ecn.html

Microsoft® Windows® XP
- 8, 12, 13, 15, 17 and 19 inch HD xxT21 units:
- Please use Touch Screen Driver Wizard and install eGalaxTouch Drivers (XPE_5.11.0.9223).

Microsoft® Windows® 7 / Microsoft® Windows® 8 / Microsoft® Windows® 8.1 / Microsoft® Windows® 10 IoT
- All HD xxT21 / T22 / MVD units:
- Please use Windows® Generic HID driver, no specific driver needed to use multi-touch.

Microsoft® Windows® 7 32 bit only
- HD 07T22 / HD 13T22 units:
- Please use Windows® Generic HID driver, no specific driver needed to use multi-touch.

Linux (openSUSE® 11.4, Fedora™ 15, Ubuntu® 10.04 LTS, Ubuntu® 12.04 LTS)
- All units:
- Please use Linux Generic Touch driver.
  Note: Kernel before 2.6.38: Single touch support.
  Note: Kernel above 2.6.38: Multi touch support.

*32bit only available for HD 07T22 / HD 13T22 units. Other units, 32/64 bit supported.

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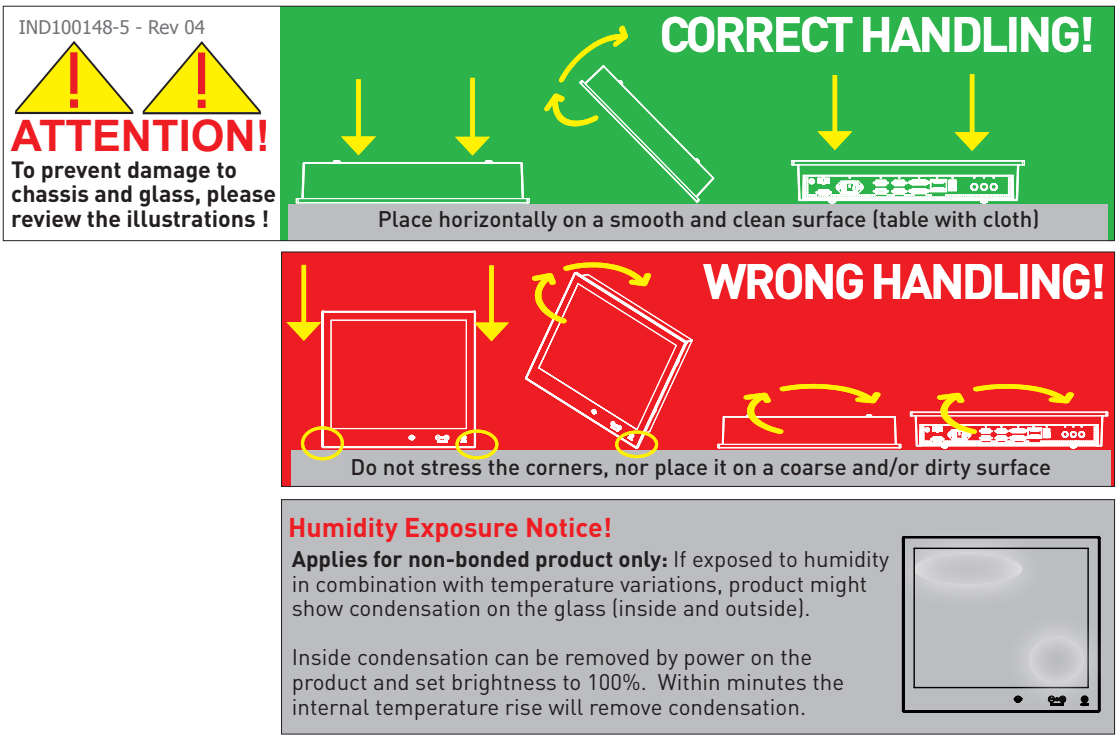
Installation

First Things First!



Installation and mounting

1. Most of our products are intended for various methods of installation or mounting (panel mounting, bracket mounting, ceiling/wall, console 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 thermal situation we recommend to use forced air passing by the product. In some cases, convection based cooling can create “heat zones” around the product. 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.

10. Expose to heavy vibration and acoustic noise might under certain circumstances affect functionality and expected lifetime. This must be considered during system assembly and installation. Mounting position must carefully be selected to avoid any exposure of amplified vibration.

Installation limitations

Due to environmental factors, please review the points noted below.

A: Overheat prevention:

For Maritime Multi Computer (MMC, Panel Computers) it is advised that you do not mount the unit in a vertical angle lower than ±30 degrees, as noted in point 3 (previous section), i.e. flat mounting of the unit. This is to prevent both overheating the unit as well as ensure proper cooling airflow to sustain long-life and stable operation. Panel Computer units generate more heat than regular Display units naturally because of CPU and mainboard chips.

It should be noted that 24” and 26” MMC units have internal fans providing additional cooling airflow of their own, whilst smaller units (typically 8” to 19”) has no internal fans. In such cases, the ±30 vertical angle may in certain situations allow for lower angle mounting provided that the console casing has adequate cooling (see point D), however this is suggested as a trouble-shooting tip during installation or during short-term observer use if found suitable. It should not be considered as a defintive trusted solution.

B: Glass Display Control™ (GDC) front glass touch buttons:

As this uses Projected Capacitive technology (instead of conventional hard physical buttons and knobs), the touch controller can react and are sensitive to raindrops (for outdoor installations). To ensure that raindrops do not stay on the unit’s flat glass surface, please do not mount the unit in a vertical angle lower than ±30 degrees, i.e. flat mounting of the unit. This is to prevent accidental touches that are similar to a human finger (cover area for a x period of seconds) as well as make sure the raindrops are “moving” and slides down off the glass surface.

For Maritime Multi Display (MMD) and Industrial Standard Display (STD) units (not available for Panel Computers (MMC) units), the angle could potentionally be lower as the On Screen Display (OSD) menu offers a "OSD Key utdoor" function with 5 seconds delay before activation on front glass functions. Please review the "OSD Menu Functions" to learn more. In certain situations this might help, but is only suggested as a trouble-shooting tip during installation or during short-term observer use if found suitable. It should not be considered as a defintive trusted solution.

C: Projected Capacitive Technology (PCTouch) MULTITOUCH and in general Touch Screen glass:

For all units with a factory mounted touch screen and for outdoor use especially, please review point B above regarding staying raindrops. Only solution to this situation is not to mount the unit in a vertical angle lower than ±30 degrees, i.e. flat mounting of the unit to ensure touch screen is not activated and accidentally automatically chooses functions in your running chart, radar or other software installed.

D: General rule for console mounted units:

To ensure proper cooling airflow, long-life and stable operation for all units, please make sure that the console casing have either fans or decent ventilation holes to prevent overheating inside the console due to the combined temperature of both Display or Panel Computer units together with other electronic instruments. A general rule is to make sure the console casing is capable of expelling “worst case scenario” in respect of the “Max Power Consumption” of all devices installed. Please review also point 2, 5, 6 and 9 (previous section) for additional information and installation tips.

Note that 24” and 26” Panel Computer units have their own internal fans. See point A for more information.

General Installation Recommendations

General mounting instructions

1. 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.

2. 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.

3. 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.

4. 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.

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

6. 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.

7. This Product shall be grounded to protective Earth. For AC Power cables this is done through the ground wire in the connector, for DC input the ground bolt shall be used. A shorter and thicker cable gives better grounding. A 6mm² is recommended, but a 4mm² or even 2.5mm² can be used for this purpose

8. 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.

9. The classification is only valid for approved mounting brackets provided by Hatteland Display. The unit shall be mounted stand-alone without any devices or loose parts placed at or nearby the unit. Any other type of mounting might require test and re-classification.

General Installation Recommendations

Ergonomics

1. The front surface of the display glass has an anti-reflective (AR) coating which can be scratched and damaged with improper cleaning. It is recommended to use only 90+% pure Isopropyl alcohol (Isopropanol) and a soft fabric cloth for this first cleaning. Fold a cloth into a small pad, dampen the cloth with alcohol, and wipe the glass from one edge to the other in one direction with one continuous motion. The product glass will require cleaning as needed. The soft cloth & alcohol wipe is recommended to clean fingerprints and oils off the glass. Water stains (including coffee, tea & coke) should be first cleaned off the glass with a soft fabric cloth wet with water, immediately followed with wiping using an alcohol wetted cloth.

2. 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.

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

4. 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.

5. 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, venetian blinds, distance from the windows, dark colouring of the deckhead). However, units can be offered with optical enhanced technology and/or High Bright panels 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.

6. 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).

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

17 inch = 907mm	19 inch = 1010mm	24 inch = 951mm	26 inch = 985mm		

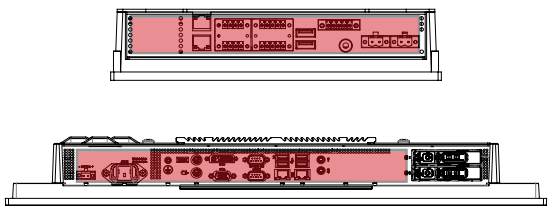
Cables

Use only high quality shielded signal cables.

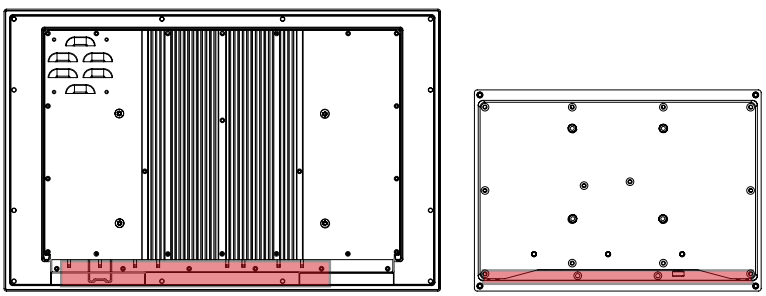
Cable Entries & Connectors (Marked area)

Illustration below for smallest/largest sizes only.

Bottom View



Back View



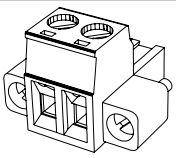
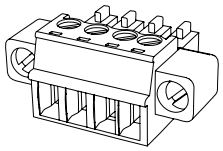
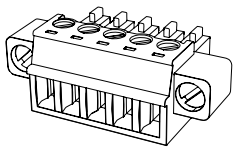
General Installation Recommendations

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.

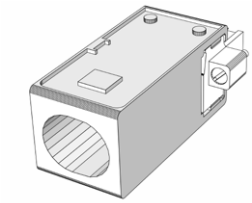
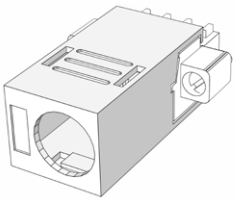
Housing / Terminal Block Connector Overview

Housing / Terminal Block connectors are available in different sizes (example 2-pin, 4-pin, 5-pin) which plugs into the connector area of the unit. They are mounted by factory default and delivered with the unit. The housing / terminal block connectors have steering rails, which ensures that it can not be mounted wrong. The color of these connectors may vary between black, green and orange depending on manufacturer. You may use approved equivalents of these connectors, but note that warranty will be void if any damage would occur to either the unit's original PCB terminal socket connector or inside the unit (electronic components, boards etc.). The table below is applicable for any Series X products, such as Display and Panel Computers, including newer type of Stand-Alone Computers.

Illustration	Pins	Manufacturer Details	Connector used for module
	2-pin	MSTB 2,5/ 2-STF-5,08 BK Screwdriver: SZS 0,6x3,5, slot-headed. Tightening torque min. 0.5 Nm. Tightening torque max 0.6 Nm.	• DC Power IN (24VDC) - Single Input Identified on Hatteland Display product data sheet as: "Terminal Block 5.08"
└ Reference: http://catalog.phoenixcontact.net/phoenix/treeViewClick.do?reloadFrame=true&UID=1961986			
	4-pin	BCZ 3.81/04/180F SN BK BX Screwdriver: 0.4x2.5mm DIN 5264. Tightening torque min.. 0.2 Nm. Tightening torque max. 0.25 Nm.	• CAN Interface (ZIA0001310-B) Identified on Hatteland Display product data sheet as: "Terminal Block 3.81"
└ Reference: http://catalog.weidmueller.com/catalog/Start.do?localeId=en&ObjectID=1792970000			
	5-pin	MC 1,5/ 5-STF-3,81 Screwdriver: SZS 0,4X2,5mm VDE, slot-headed. Tightening torque min. 0.22 Nm. Tightening torque max 0.25 Nm.	• RS-422 / RS-485 NMEA (PCA100293-1 / Q170 IO) • Digital Input/Output (PCA100297-1 / Q170 IO) Identified on Hatteland Display product data sheet as: "Terminal Block 3.81"
└ Reference: http://catalog.phoenixcontact.net/phoenix/treeViewClick.do?reloadFrame=true&UID=1827732			

General Installation Recommendations

If your installation require additional cable fasteners support, please visit and purchase directly from manufacturer: Illustrations below are approximate, actual Housing and Hood may deviate slightly, but function remains the same.

Cable Housing - Illustration	Cover Hood - Illustration
	
KGG-MSTB 2,5/ 2 (2-pin) KGG-MC 1,5/ 5 (5-pin)	BCZ 3.81 AH04 BK BX (4-pin) BCZ 3.81 AH05 BK BX (5-pin)
For 2-pin and 5-pin: https://www.phoenixcontact.com/online/portal/us?uri=pxc-oc-itemdetail:pid=1803934&library=usen&pcck=P-11-02-01&tab=1 https://www.phoenixcontact.com/online/portal/us?uri=pxc-oc-itemdetail:pid=1834372&library=usen&pcck=P-11-02-01&tab=1 For 4-pin and 5-pin http://catalog.weidmueller.com/procat/Product.jsp;jsessionid=B040D5EB6832629E567C884809FDF6C1?productId=(%5b1005290000%5d) http://catalog.weidmueller.com/procat/Product.jsp;jsessionid=D399022A1B3211C0146BCBE716D93211?productId=(%5b1005300000%5d)	

Configuring Housing / Terminal Block connectors

Below is a brief illustration that might be useful during configuration and installation of such connectors. You will need suitable pre-configured cable(s) and tools to configure the connector(s) and cable(s) that are present in your installation environment. Below is a sample procedure for a 2-pin DC power connector. The procedure is the same for other connectors of this type as listed in table above. Unit used as illustration below is for reference only.

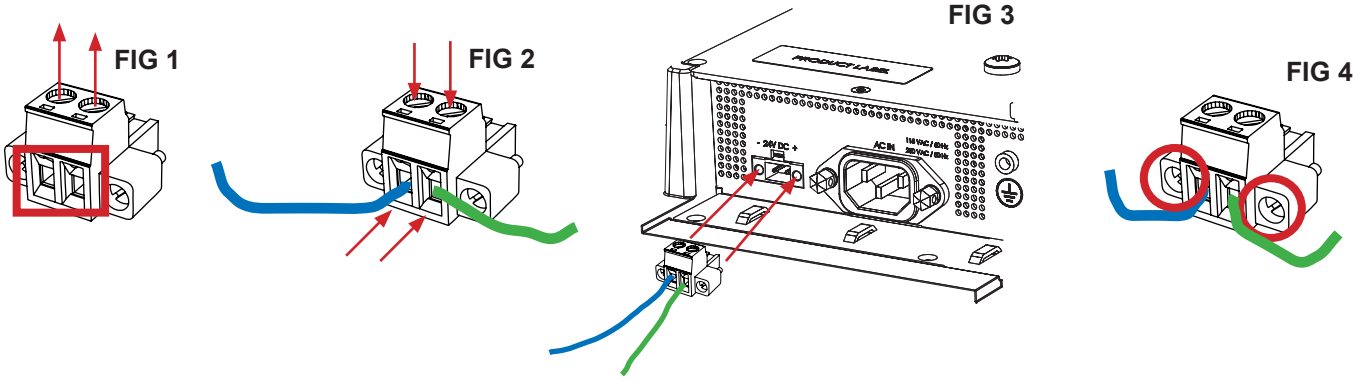


FIG 1: Unscrew (from top) or make sure that the screw terminal (square area) are fully open, so you can secure the inserted cables correctly to the loose housing connector (it may already be plugged into the unit as per factory installation).

FIG 2: Insert cables* (from front) and screw / secure the cables by turning the screw on top of the housing to secure the cables properly. Check that the cables is firmly in place and do not appear loose or falls out when pulling gently.

**Note: Required polarization verification (for instance -/+ for DC power input) should conform with the markings on the connector area of the unit. Ignoring the markings on the unit or its add-on modules might damage the unit and/or external equipment in which end, warranty will be void.*

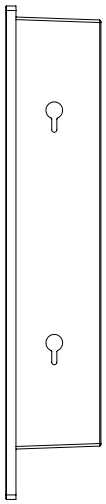
FIG 3: Plug the housing into the appropriate connector area of the unit (glass should be facing down) and check again that the cables secured conforms with the markings on the connector area of the unit. Finalize the installation by fasten the screws located in front on each side of the housing connector **(FIG 4).**

Panel / Console Mounting Bracket Kit for 12”,15”,17”,19” - Single Key Hole

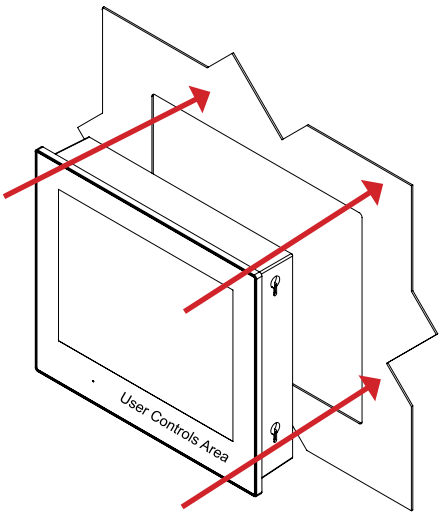
You need: Allen Wrench tool (3mm), 4 pcs of HD CMB SX1-A1 / -A2 or -A3 Kit (-A1 or -A2 included in delivery).
Procedure suitable for: Display and Panel Computers with Single Key Hole. Brackets are EN60945 Tested.

Attention: A suitable pre-cut panel cutout should be made prior to mounting. Do not force the unit into the panel cutout as it might break the outer glass or scratch the chassis on the unit. Make sure that the panel cutout is not too tight for the unit. Please disconnect ALL cables before proceeding. Please re-check the relevant and required panel cutout measurements if unsure.

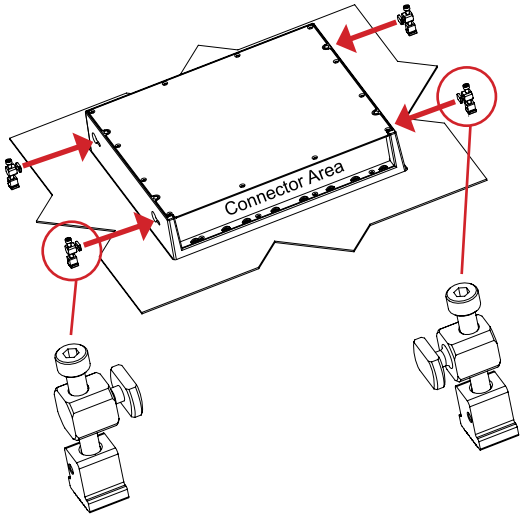
Confirm you have the Single Key Hole model before proceeding!



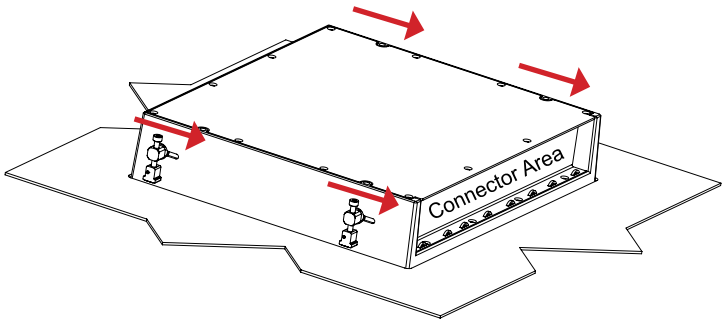
1: Slide the unit into the cutout carefully. User Controls and Connector Area should be facing downwards.



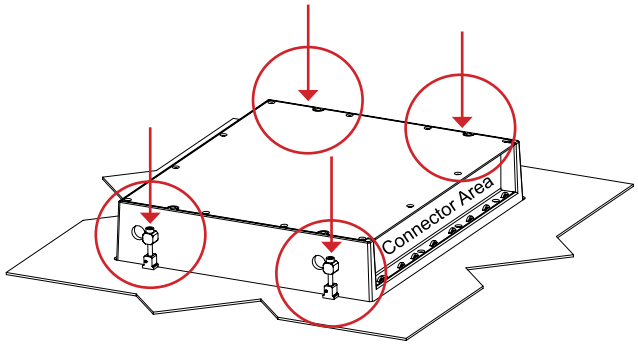
2: Prepare and position the brackets into each of the four key holes. The key part goes into the unit’s largest area of the keyhole, while the Allen screw is visible at the top. See closeup.

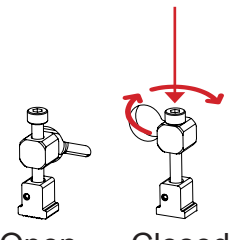


3: When all brackets fits inside the keyhole, slide them down into the narrow gap. If you are unable to slide them down, simply adjust/loosen the top Allen Screw slightly and try again.



4: Secure the unit by fastening the top Allen screws fairly. Make sure you do it equally and even for all 4 sides. Do not use excessive force. See closeup of a open and closed position to the right.



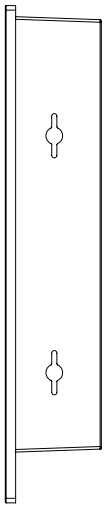


Panel / Console Mounting Bracket Kit for 12”,15”,17”,19” - Double Key Hole

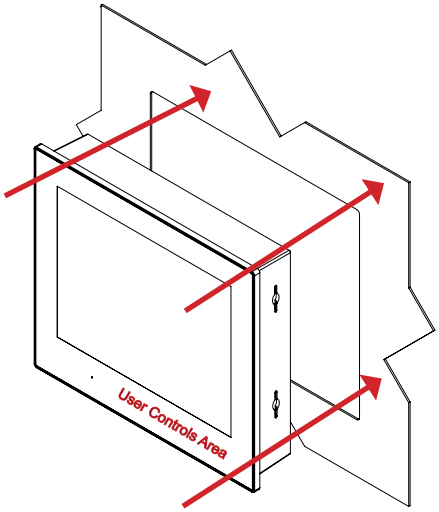
You need: Allen Wrench tool (3mm), 4 pcs of HD CMB SX1-A1 / -A2 or -A3 Kit (-A1 or -A2 included in delivery).
Procedure suitable for: Display and Panel Computers with Double Key Hole. Brackets are EN60945 Tested.

Attention: A suitable pre-cut panel cutout should be made prior to mounting. Do not force the unit into the panel cutout as it might break the outer glass or scratch the chassis on the unit. Make sure that the panel cutout is not too tight for the unit. Please disconnect ALL cables before proceeding. Please re-check the relevant and required panel cutout measurements if unsure.

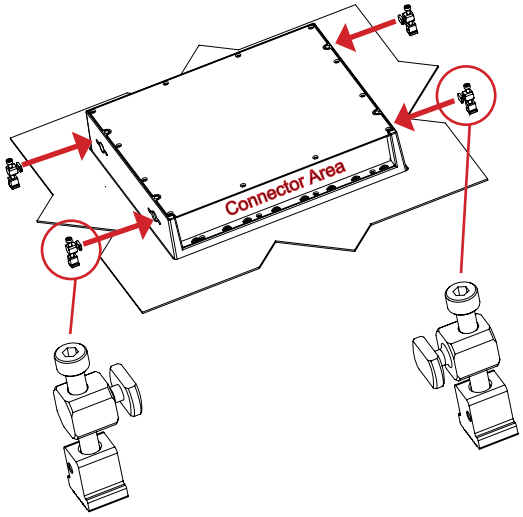
Confirm you have the Double Key Hole model before proceeding!



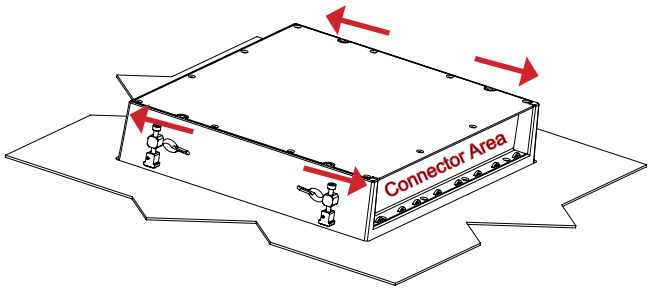
1: Slide the unit into the cutout carefully. User Controls and Connector Area should be facing downwards.



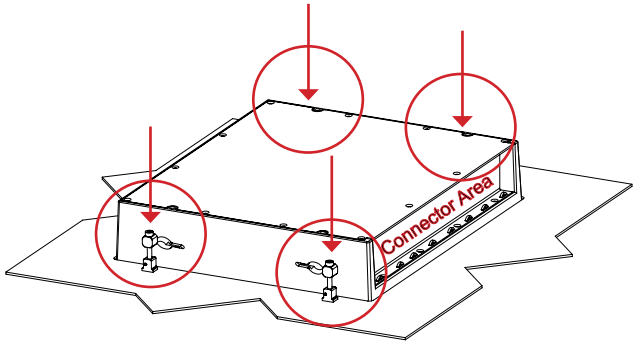
2: Prepare and position the brackets into each of the four key holes. The key part goes into the unit’s largest area of the keyhole, while the Allen screw is visible at the top. See closeup.

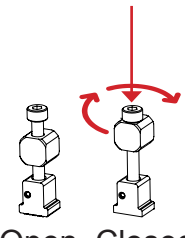


3: When all brackets fits inside the keyhole, slide them to opposite positions from eachother (upper to up, and lower to down) into the narrow gaps, If you are unable to slide them up/down, simply adjust/loosen the top Allen Screw slightly and try again.



4: Secure the unit by fastening the top Allen screws fairly. Make sure you do it equally and even for all 4 sides. Do not use excessive force. See closeup of a open and closed position to the right.



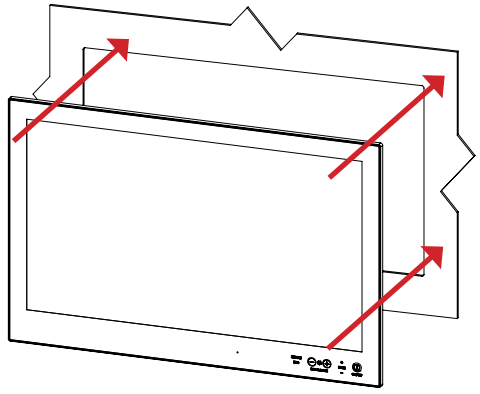


Panel Cutout / Console Mounting Bracket Kit for 24”

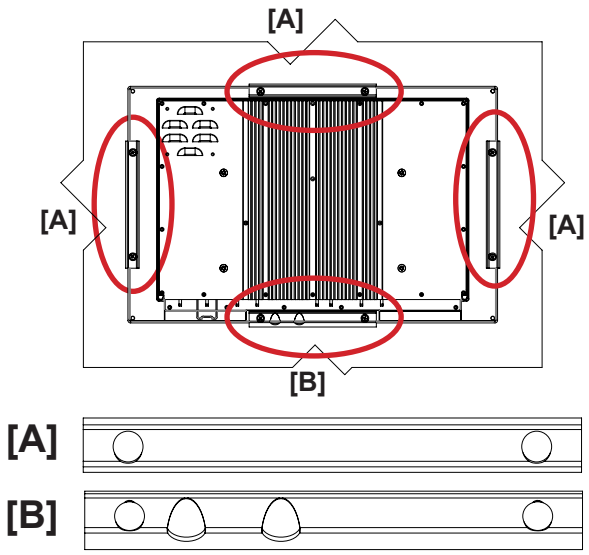
You need: Torx T25 tool, 1 pcs of HD CMB SX1-B1 kit (included in delivery).
Procedure suitable for: Display and Panel Computers Series X range. Brackets are EN60945 Tested.

Attention: A suitable pre-cut panel cutout should be made prior to mounting. Do not force the unit into the panel cutout as it might break the outer glass or scratch the chassis on the unit. Make sure that the panel cutout is not too tight for the unit. Please disconnect ALL cables before proceeding. Please re-check the relevant and required panel cutout measurements if unsure.

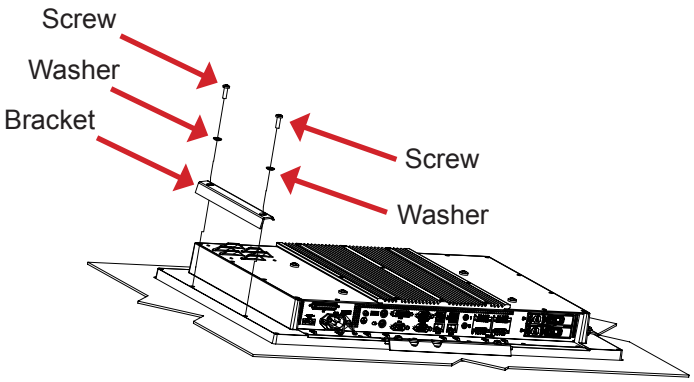
1: Slide the unit into the cutout carefully. User Controls and Connector Area should be facing downwards.



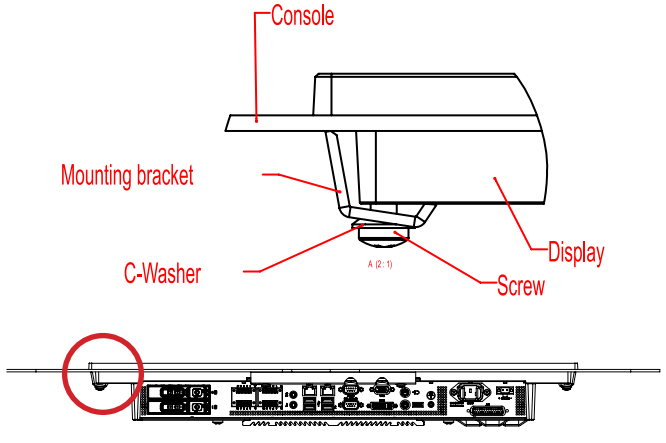
2: Make sure you are aware that brackets should be mounted on TOP, LEFT, RIGHT and BOTTOM sides. Note that the [B] bracket is different than the [A] brackets and mounted near the connectors. See closeup of details.



3: Secure each bracket with the provided M5x16 screws and C-Washers as illustrated below. Make sure you do it equally and even for all 4 sides. Use Torque Force 3.0Nm, 2 screws and 2 washers pr. bracket. Note the orientation of brackets before you begin.



4: Review closeup of the mounting of brackets with screws and C-Washers in place. Seen from bottom side.

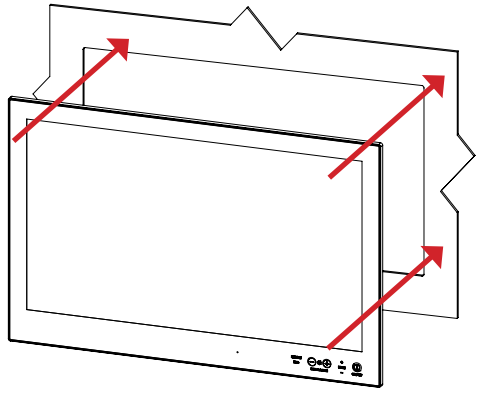


Panel Cutout / Console Mounting Bracket Kit for 26”

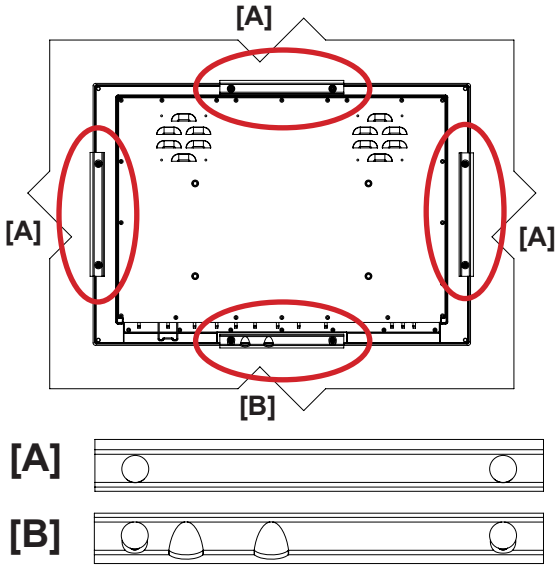
You need: Torx T25 tool, 1 pcs of HD CMB SX1-C1 kit (included in delivery).
Procedure suitable for: Display and Panel Computers Series X. Brackets are EN60945 Tested.

Attention: A suitable pre-cut panel cutout should be made prior to mounting. Do not force the unit into the panel cutout as it might break the outer glass or scratch the chassis on the unit. Make sure that the panel cutout is not too tight for the unit. Please disconnect ALL cables before proceeding. Please re-check the relevant and required panel cutout measurements if unsure.

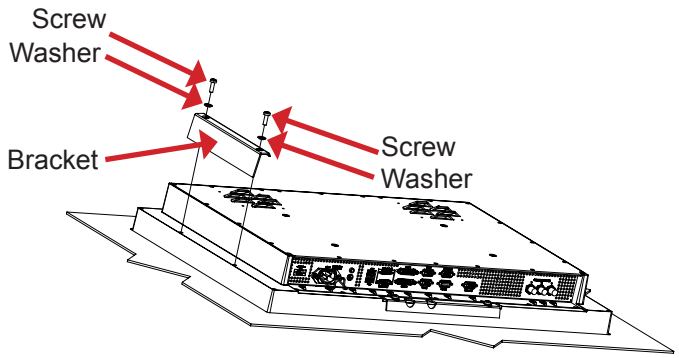
1: Slide the unit into the cutout carefully. User Controls and Connector Area should be facing downwards.



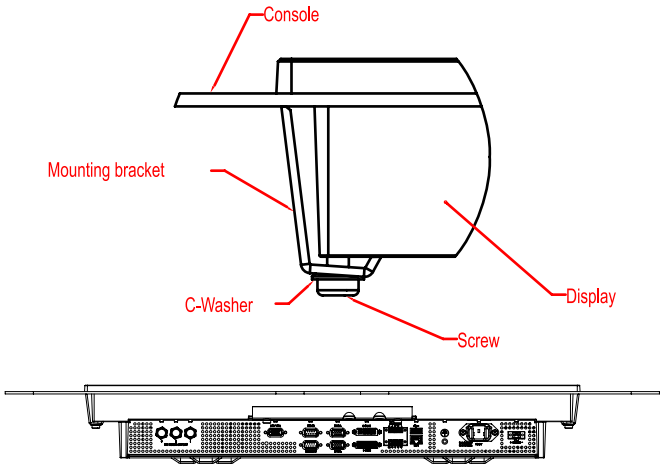
2: Make sure you are aware that brackets should be mounted on TOP, LEFT, RIGHT and BOTTOM sides. Note that the [B] bracket is different than the [A] brackets and mounted near the connectors. See closeup of details.



3: Secure each bracket with the provided M5x16 screws and C-Washers as illustrated below. Make sure you do it equally and even for all 4 sides. Use Torque Force 3.0Nm, 2 screws and 2 washers pr. bracket. Note the orientation of brackets before you begin.



4: Review closeup of the mounting of brackets with screws and C-Washers in place. Seen from bottom side.



Mounting Bracket, Table / Desktop / Ceiling - 12”,15”,17”,19”

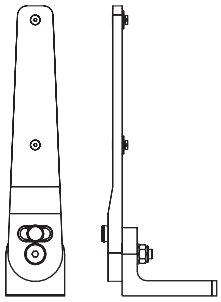
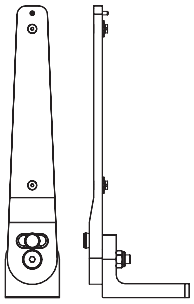
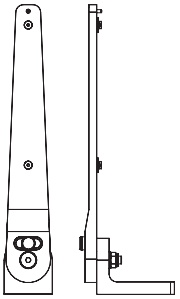
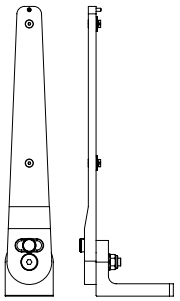
Procedure suitable for: Display (MMD/STD) and Panel Computer (MMC) Series X product ranges.

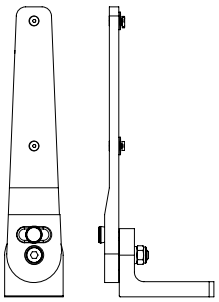
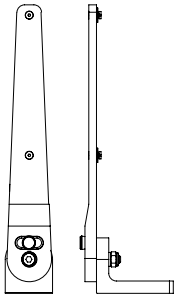
Two versions of bracket exists, please review the table below to identify your unit model and bracket type. Brackets that are currently sold/delivered are marked with **green** color. Those which are obsolete (and replaced by newer type of bracket) are shown in **red** color. The two bracket types exists due to slight variation in manufacturing regarding the unit’s mounting holes (key hole) that exist with either “single key hole” or “double key hole”.

Bracket Arms are clearly marked with Typenumber label so you can identify which version you have (BRD or TMB).

Note: If you ordered a unit with mounting bracket from factory, the corresponding matching bracket has been already been chosen to ensure correct fitting. If you order brackets separately at a later date, you should study the table below carefully as well as review the type of key hole your Display or Panel Computer units has. If unsure, please contact Hatteland Display for support in choosing the correct bracket version (BRD or TMB).

Table last updated 09 Feb 2015. Throughout 2015 the BRD (HW00) versions will be phased out of production and only TMB (HW01) versions will remain available for manufactured units.

Typenumber	Illustration	Fits unit model	Notes	Status
HD 12BRD SX1-A1		HD 12T21 MMD-xxx-Fxxx HD 12T21 STD-xxx-Fxxx HD 12T21 MMC-xxx-xxxx	“HW blank” and “HW00”: Sold since 2014. Fits Single Key Hole Chassis only. Will be replaced by “HW01”, when HW00 is out of stock. “HW01”: For Double Key Hole Chassis, use HD TMB SX1-A1 (see next page).	
HD 15BRD SX1-A1		HD 15T21 MMD-xxx-Fxxx HD 15T21 STD-xxx-Fxxx HD 15T21 MMC-xxx-xxxx	“HW blank” and “HW00”: Sold since January 2013, fits only Single Key Hole Chassis. Will be replaced by “HW01”, when HW00 is out of stock. “HW01”: For Double Key Hole Chassis, use HD TMB SX1-A1 (see next page).	
HD 17BRD SX1-A1		HD 17T21 MMD-xxx-Fxxx HD 17T21 STD-xxx-Fxxx HD 17T21 MxC-xxx-xxxx	“HW blank” and “HW00”: Sold since June 2012, fits only Single Key Hole Chassis. Obsolete, replaced by “HW01”. “HW01”: For Double Key Hole Chassis, use HD TMB SX1-B1 (see next page).	
HD 19BRD SX1-A1		HD 19T21 MMD-xxx-Fxxx HD 19T21 STD-xxx-Fxxx HD 19T21 MxC-xxx-xxxx	“HW blank” and “HW00”: Sold since March 2012, fits only Single Key Hole Chassis. Obsolete, replaced by “HW01”. “HW01”: For Double Key Hole Chassis, use HD TMB SX1-B1 (see next page).	

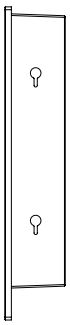
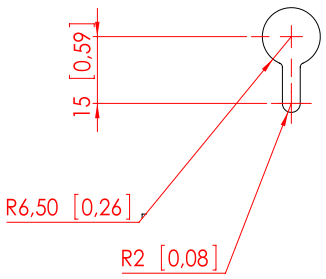
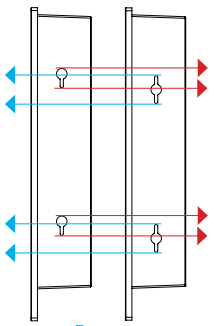
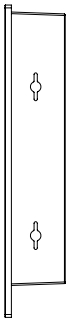
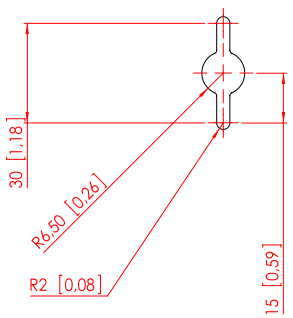
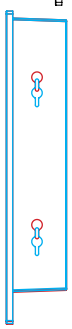
HD TMB-SX1-A1		HD 12T21 MMD-xxx-Fxxx HD 12T21 STD-xxx-Fxxx HD 12T21 MMC-xxx-xxxx HD 15T21 MMD-xxx-Fxxx HD 15T21 STD-xxx-Fxxx HD 15T21 MMC-xxx-xxxx	"HW01": Sold since April 2012. Fits Double Key Hole Chassis only.	
HD TMB-SX1-B1		HD 17T21 MMD-xxx-Fxxx HD 17T21 STD-xxx-Fxxx HD 17T21 MxC-xxx-xxxx HD 19T21 MMD-xxx-Fxxx HD 19T21 STD-xxx-Fxxx HD 19T21 MxC-xxx-xxxx	"HW01": Sold since May 2012. Fits Double Key Hole Chassis only.	

* Note: Reference to HWxx (Hardware Code) can be identified by number of digits in a Display or Panel Computer serial number. Each HWcode upgrade will add 10000 in value to exisiting Serial Number counting.

Single Key Hole vs Double Key Hole

Our Display or Panel Computer units may have Single Key Hole, whilst others have Double Key Hole present in the chassis sides. This is due to slight variation in initial production vs Mass Production throughout 2012-2015. It should be noted that Single Key hole units does not support ceiling mount. Double Key Hole supports ceiling mount of unit.

Single or Double Key Hole can be identified as follows:

Key Hole Type	Key Hole Location (seen from both sides)	Key Hole Dimensions	Key Hole Difference
Single			
Double			

Important to know about LEFT and RIGHT brackets

Throughout the following installation procedure for both BRD and TMB brackets, it is important to understand the difference between LEFT and RIGHT brackets. The Display and Panel Computer chassis are not 100% square boxed, but are slightly designed with a minor narrow angled chassis towards the rear (FIG1) to allow easier “drop-in” of units into consoles. Likewise to get a correct footprint placement of the brackets, both brackets feature a slight angled design on the oval circled cut shaped block to compensate for this (FIG2) making LEFT and RIGHT bracket slightly different and naturally has to be correctly mounted.

Please ensure that LEFT and RIGHT brackets are as indicated in FIG4, and not as shown in FIG3 below.

FIG 1
Red Line straight up
Green Line indicates slight angled design of chassis

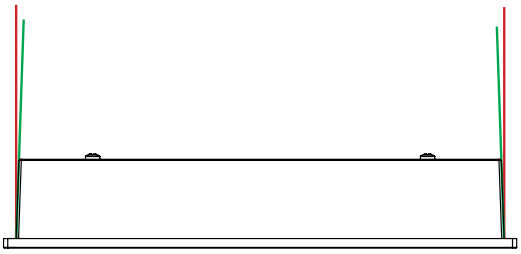


FIG 2
Location of angled block,
and seen straight from top showing slight angle

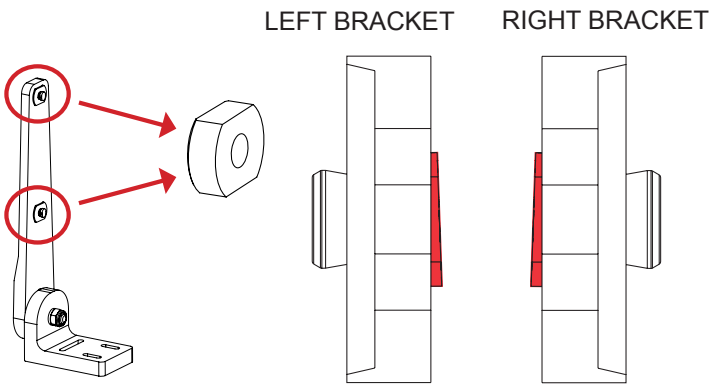


FIG 3 - Seen from under bracket base
Wrong mounting of LEFT / RIGHT Brackets
Indicating footprint is incorrect

FIG 4- Seen from under bracket base
Correct mounting of LEFT / RIGHT Brackets
Indicating footprint is correct

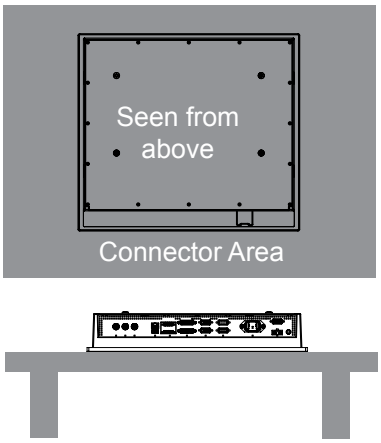
Installation Procedure - BRD Versions

Procedure suitable for: Display (MMD/STD) and Panel Computer (MMC) Series X product ranges.

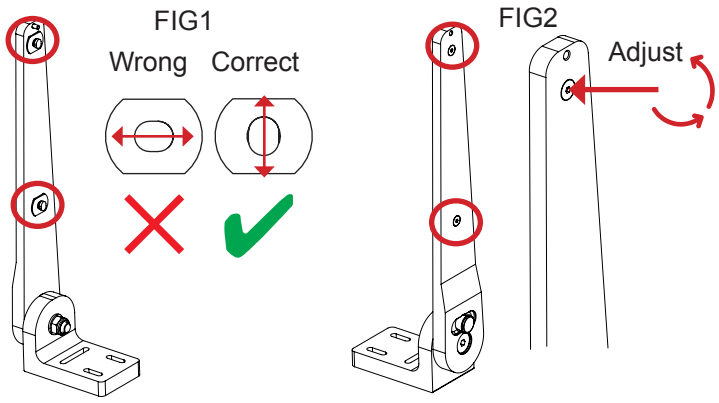
You need:
- M4, M5 Unbrako® Hex Key tool (not included with delivery).
- Fasteners (6 pcs M6) for mounting complete unit onto table or desktop location (not included with delivery).
- 1 pcs of HD xxBRD SX1-A1 Mounting Bracket Kit, where xx=15, 17 or 19 inch.

Attention: A suitable pre-drilled location and knowledge of measurements for both main unit and brackets/tilting functionality should be prepared and checked prior to mounting. Please disconnect ALL cables before proceeding. Please review User Manual or visit www.hatteland-display.com for Technical Drawings regarding measurements for both main unit and Mounting Brackets.

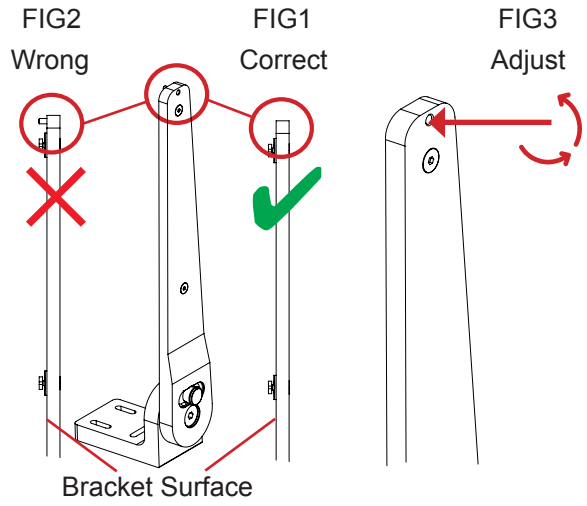
▼ 1: Place the unit on a dry, flat, clean, soft surface (i.e. table) with the glass front facing down as illustrated. Connector area should be facing downwards from you.



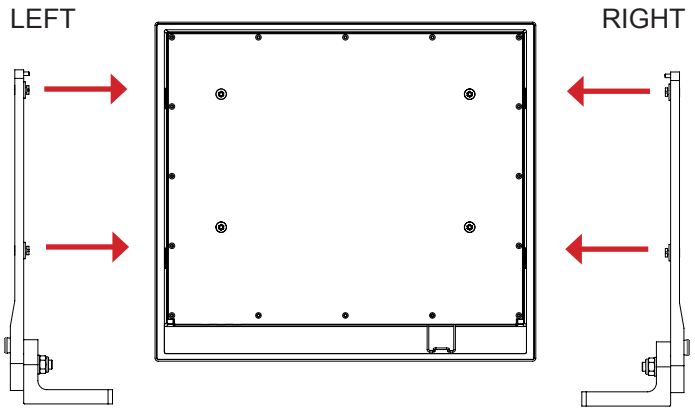
▼ 2: Inspect the inner side of both brackets and especially the orientation of the Key Hole Plug (4 pcs). They should be shaped as an standing “egg” to ensure proper fitting in the Key Hole of unit (FIG1). Note: You may have to loose the fastening screw (M5) (FIG2) if the Key Hole Plug can not be turned by hand.



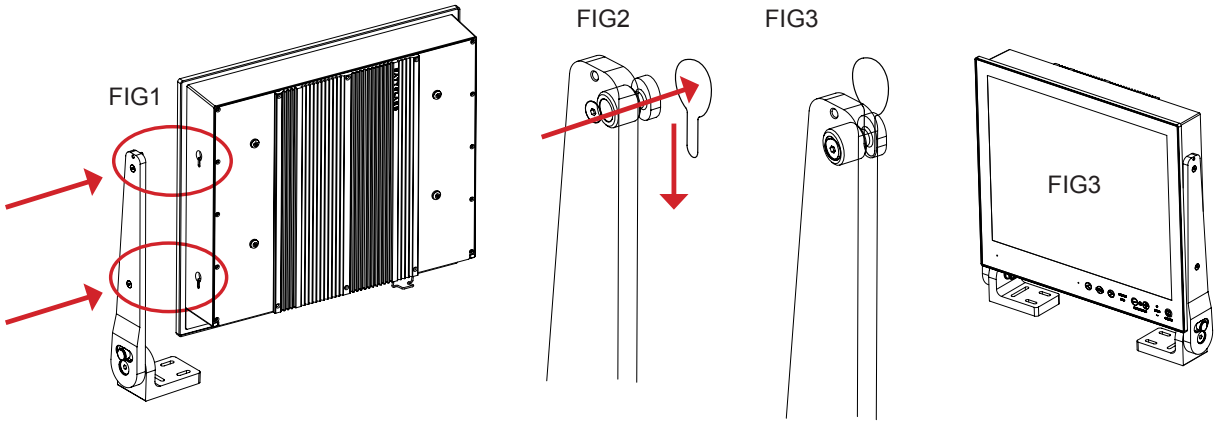
▼ 3: Verify that the Key Hole Set Screw (M4) is aligned with the bracket surface (FIG1). If this screw appear too far out (FIG2), proper fitting into the Key Hole can not be completed. Turn screw clockwise or anti-clockwise (FIG3) to adjust the position.



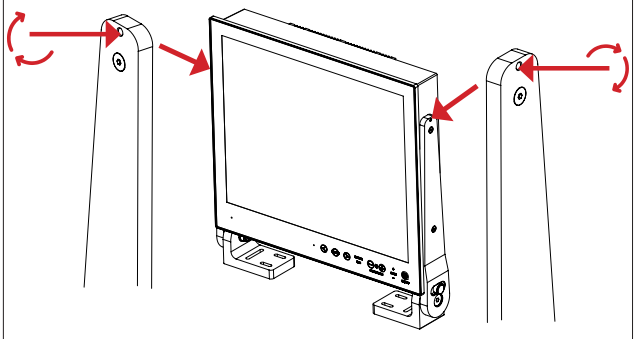
▼ 4: Notice the indication of LEFT and RIGHT. The mounting bracket (2 pcs) is marked with respective stickers “L” and “R” from factory. Please make sure that LEFT bracket is positioned on LEFT side and RIGHT bracket is positioned on the RIGHT side as shown below.



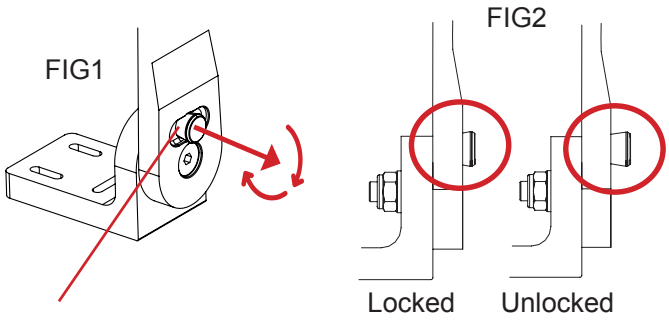
▼ 5: Ensure that both Key Hole Plugs slide into the Key Holes and goes to the bottom position (FIG1 and FIG2). If they appear too tight, you may loose the Key Hole Plug screw a few turns and re-try (see previous step 2). FIG3 shows Key Hole Plug correctly into Key Hole and both brackets in place.



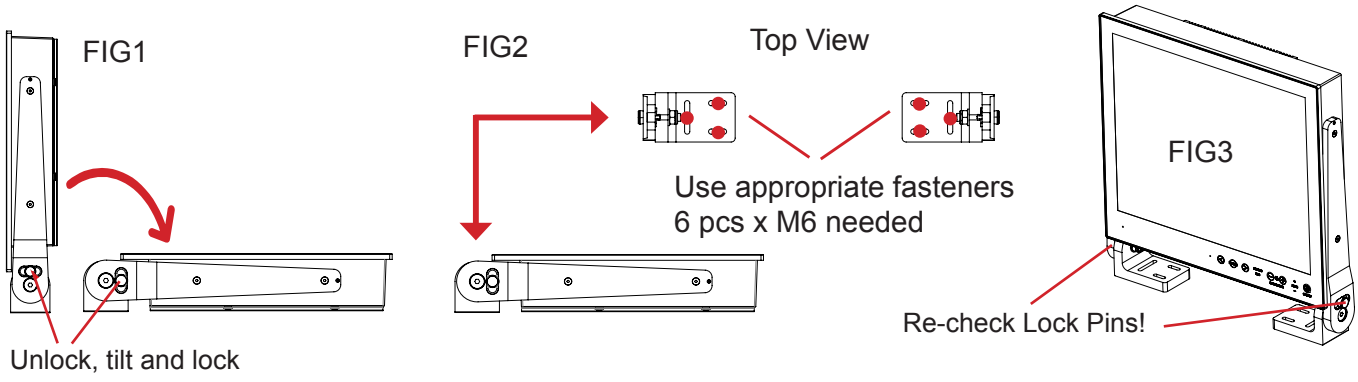
▼ 6: Tighten Key Hole Screw firmly on each side and make sure the brackets are properly mounted and aligned to the main chassis of unit. Verify with your hands that both brackets are firmly attached.



▼ 7: While unit is lying flat on table, check the Tilting Lock Pin position. These can be pulled out by hand, turned 90° (FIG1) and turned back 90° until the Lock Pin automatically clicks into place by a spring (FIG2).



▼ 8: You may now mount the unit onto your desired location. It is advised that you unlock the Lock Pin (as shown in step 7), tilt the unit 90 degrees backwards (FIG1) and properly fasten the bracket base into location (FIG2). **NB! Be careful not to break or scratch the edge of the front glass!** Then repeat step 7 again until your desired tilting position has been achieved and you have verified that the Lock Pin are in locking position and the unit is firmly attached and does not appear loose (FIG3).



Single Key hole units does not support ceiling mount.

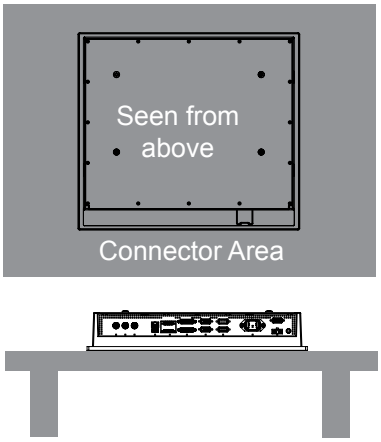
Installation Procedure - TMB Versions

Procedure suitable for: Display (MMD/STD) and Panel Computer (MMC) Series X product ranges.

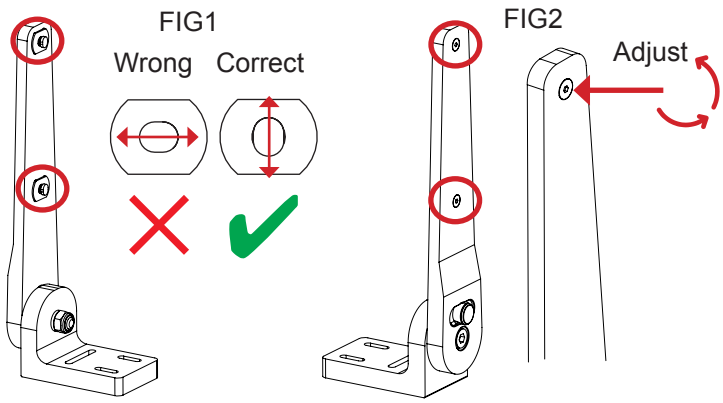
You need:
- M4 Unbrako® Hex Key tool (not included with delivery).
- Fasteners (6 pcs M6) for mounting complete unit onto table or desktop location (not included with delivery).
- 1 pcs of HD TMB SX1-A1 Mounting Bracket Kit (for 12 and 15 inch)
- or 1 pcs of HD TMB SX1-B1 Mounting Bracket Kit (for 17 and 19 inch)

Attention: A suitable pre-drilled location and knowledge of measurements for both main unit and brackets/tilting functionality should be prepared and checked prior to mounting. Please disconnect ALL cables before proceeding. Please review User Manual or visit www.hatteland-display.com for Technical Drawings regarding measurements for both main unit and Mounting Brackets.

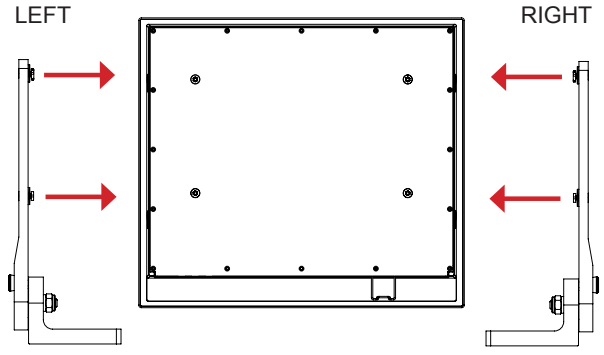
▼ 1: Place the unit on a dry, flat, clean, soft surface (i.e. table) with the glass front facing down as illustrated. Connector area should be facing downwards from you.



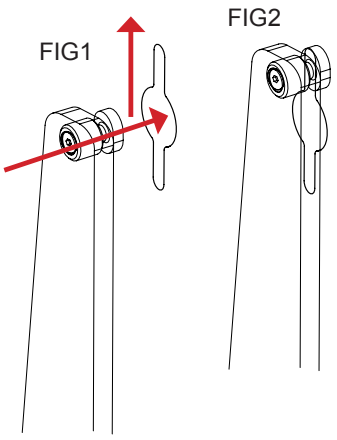
▼ 2: Inspect the inner side of both brackets and especially the orientation of the Key Hole Plug (4 pcs). They should be shaped as an standing “egg” to ensure proper fitting in the Key Hole of unit (FIG1). Note: You may have to loose the fastening screw (M5) (FIG2) if the Key Hole Plug can not be turned by hand.



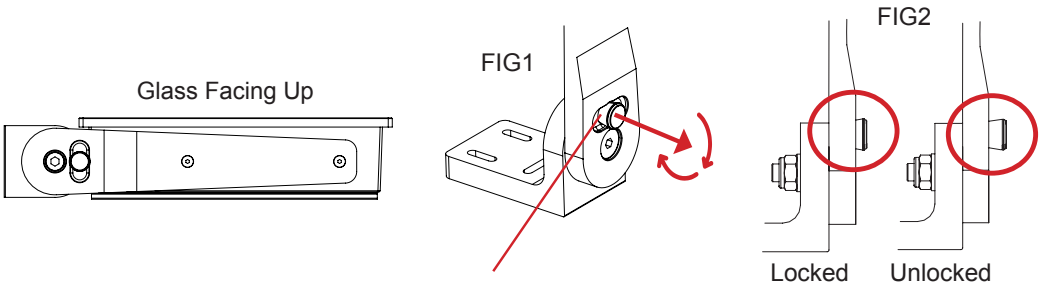
▼ 3: Notice the indication of LEFT and RIGHT. The mounting bracket (2 pcs) is marked with respective stickers “L” and “R” from factory. Please make sure that LEFT bracket is positioned on LEFT side and RIGHT bracket is positioned on the RIGHT side as shown below.



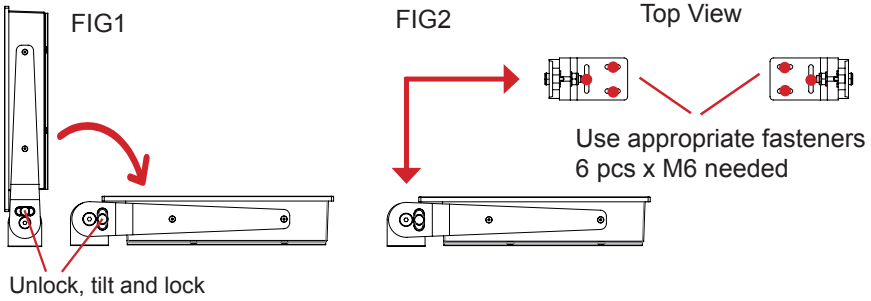
▼ 4: Ensure that both Key Hole Plugs slide into the Key Holes and goes to the upper position (FIG1 and FIG2). If they appear too tight, you may loose the Key Hole Plug screw a few turns and re-try (see previous step 2).



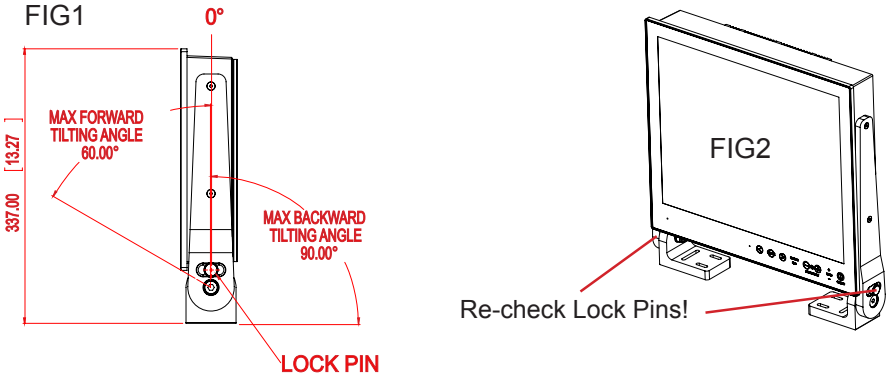
▼ 5: While unit is lying flat on table, check the Tilting Lock Pin position. These can be pulled out by hand, turned 90° (FIG1) and turned back 90° until the Lock Pin automatically clicks into place by a spring (FIG2).



▼ 6: You may now mount the unit onto your desired location. It is advised that you unlock the Lock Pin (as shown in step 5), tilt the unit 90 degrees backwards (FIG1) and properly fasten the bracket base into location (FIG2). **NB! Be careful not to break or scratch the edge of the front glass!**

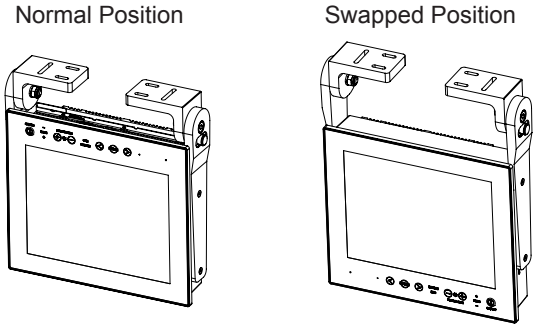


▼ 7: Max Forward and Backward angle shown below (FIG1). When your desired tilting position has been achieved, you need to verify that the Lock Pin are in locking position and the unit is firmly attached and does not appear loose (FIG2).



▼ 8: Depending on installation needs, you may mount the complete unit in ceiling in two different ways.
Normal Position: User Controls will be upside down, cables go straight up. You may configure Glass Display Control™ (GDC) LED symbols to show or not, since symbols will be seen upside down.
Review http://www.hatteland-display.com/inb100018-4.php (“Glass Display Control™ (GDC) LED & Button operations” section).

Swapped Position: User Controls readable, cables has to bend up or go straight down, Left and Right Bracket needs to be swapped, indicating Left Bracket on Right Side, and RIght Bracket on Left Side to ensure proper fitting and to avoid wrong footprint of the mounting holes of the bracket base (reference to “Important to know about LEFT and RIGHT brackets”).

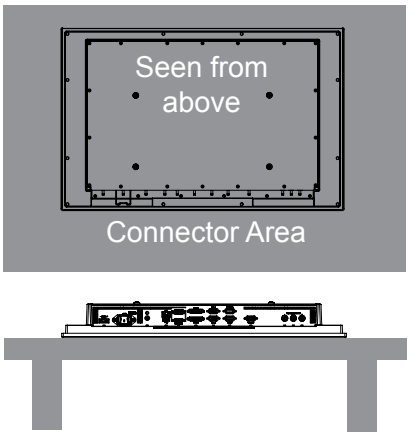


Mounting Bracket for Table / Desktop installation - 24",26"

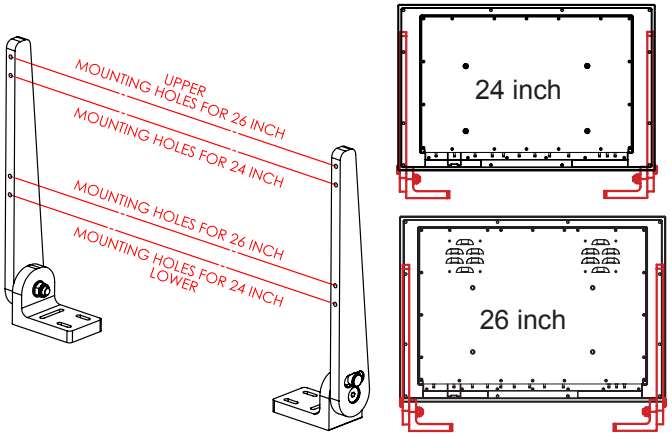
You need: M5 Unbrako® Hex Key tool and 1 pcs of HD TMB SX1-C1 Mounting Bracket Kit.
Fasteners (6 pcs M6) for Table / Desktop location not included. Procedure suitable for: Display and Panel Computers.

Attention: A suitable pre-drilled location and knowledge of measurements for both main unit and brackets/tilting functionality should be prepared and checked prior to mounting. Please disconnect ALL cables before proceeding. Please review User Manual or visit www.hatteland-display.com for Technical Drawings regarding measurements for both main unit and Mounting Brackets.

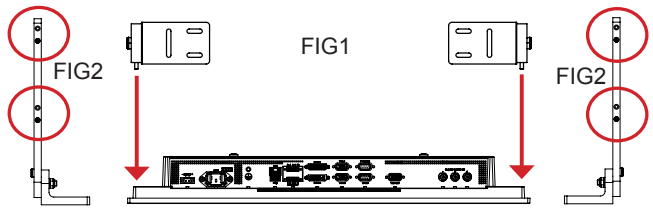
1: Place the unit on a dry, flat, clean, soft surface (i.e. table) with the glass front facing down as illustrated. Connector area should be facing downwards from you.



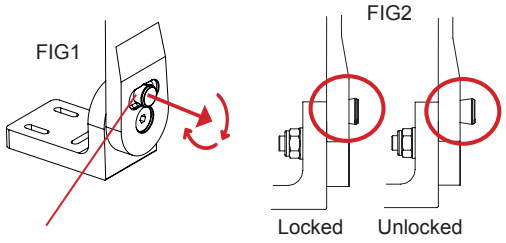
2: Inspect the mounting holes of brackets. For mounting to a 24 inch unit, please use the **lower holes** as indicated. For mounting to a 26 inch unit, please use the **upper holes** as indicated.



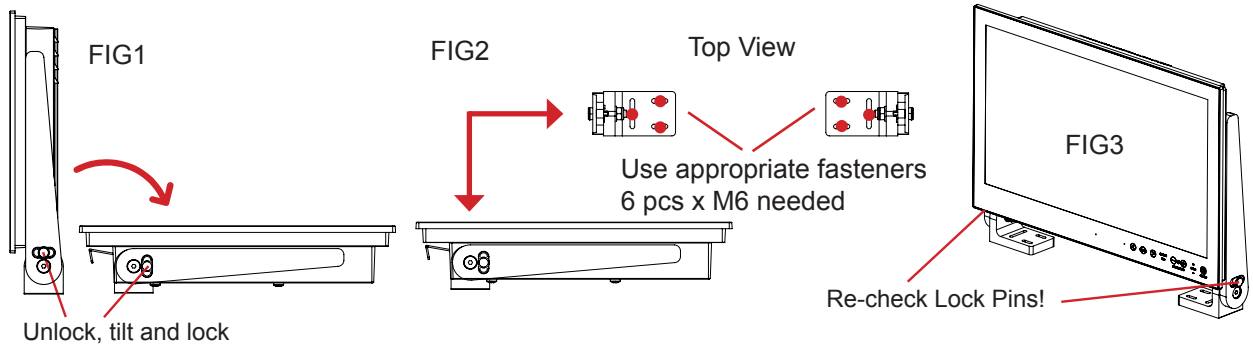
3: Place one bracket at the time with the mounting holes facing down into the suitable mounting position and fasten with 2 x M5 screws on each bracket. Torque Force 3.5Nm.



4: While unit is lying flat on table, check the Tilting Lock Pin position. These can be pulled out by hand, turned 90° (FIG1) and turned back 90° until the Lock Pin automatically clicks into place by a spring (FIG2).



5: You may now mount the unit onto your desired location. It is advised that you unlock the Lock Pin (as shown in step 4), tilt the unit 90° backwards (FIG1) and properly fasten the bracket base into location (FIG2).
NB! Be careful not to break or scratch the edge of the front glass! Then repeat step 4 again until your desired tilting position has been achieved and you have verified that the Lock Pin are in locking position and the unit is firmly attached and does not appear loose (FIG3).

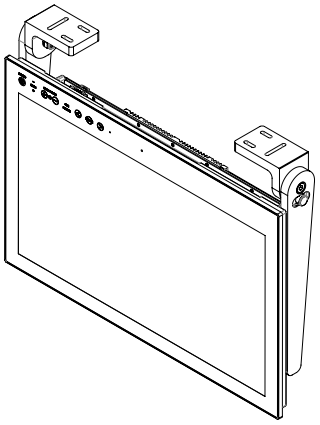


▼ 6: Depending on installation needs, you may mount the complete unit in ceiling in two different ways.

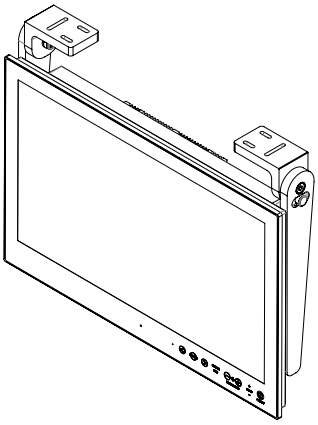
Upside Down Position: User Controls will be upside down, cables go straight up. You may configure Glass Display Control™ (GDC) LED symbols to show or not, since symbols will be seen upside down. Displayed image needs to be flipped vertically. Review http://www.hatteland-display.com/inb100018-4.php (“Glass Display Control™ (GDC) LED & Button operations” section).

Normal Position: User Controls readable, no image flip needed, cables has to bend up or go straight down.

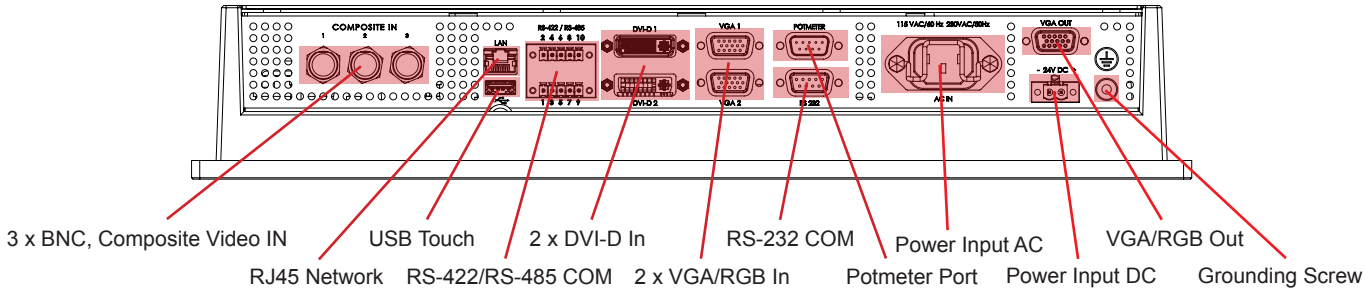
Upside Down



Normal Position



Connection area of unit (illustration)

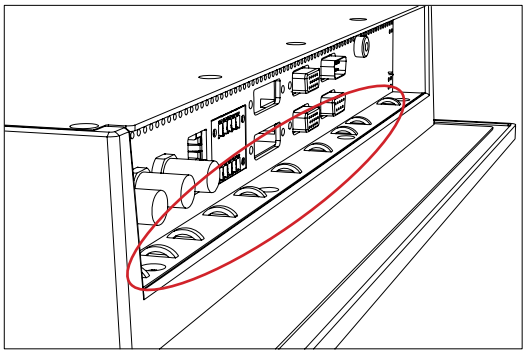


Note: 19 inch unit used as example above, please review specifications for your actual model.

Reduce Cable Tension

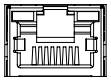
To reduce tension of the cables you connect, secure them with a cable tie to the available chassis hinges located near the connectors.

Note: Amount of chassis hinges can vary depending on model.



COMPOSITE VIDEO IN 1,2,3:

Connect a Composite Video signal (PAL/NTSC/SECAM) to any of these 3 x BNC female connectors to allow video feed to be used as Full Screen, Picture-In-Picture (PIP) or Picture-By-Picture (PBP) from i.e. cameras & DVD players in addition to the regular DVI or RGB/VGA signal input.

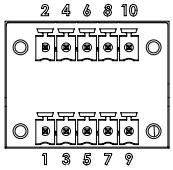


Network/LAN INPUT / OUTPUT (NET A):

Supports 10/100/1000Mbps Ethernet (LAN). Suitable for twisted pair cables CAT.5E. Make sure the network cable connector ”clicks” into the RJ-45 connector. This connector will allow remote control of the display unit to control common functions like brightness, input source and more.

USB TOUCH:

Connect a TYPE A USB Cable between this connector and your PC. Suitable drivers to install and calibrate the touchscreen are available on the separate installation media delivered with the unit. Port is USB2.0 (<5m).



RS-422 / RS-485 COM I/O:

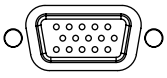
The COM (non-isolated RS-422/485) allows functionality to communicate with serial based equipment including external buzzer functionality. Connect and fasten your cables from your compatible external equipment to the 5-pin Terminal Block 3.81 connector. Please review the “Pinout Assignments” chapter as well as “Housing / Terminal Block Connector Overview” in this manual for more information.

DVI-D IN:

Connect your DVI cable to any of the two DVI-D 18+1P, Single Link Connector (female). Secure your 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.

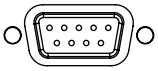
Important note for DVI signal detection:

Please note that for the operating system to detect DVI signals correctly, the DVI cable MUST be connected physically to the 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 display units.



VGA/RGB IN:

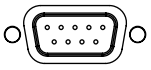
Connect your VGA cable to any of the two D-SUB 15P Connectors (female). Secure the VGA cable to the hex spacers provided on the unit and make sure you do not bend any of the pins inside the connector when connecting. Connect the other end of the cable to the VGA connector on your equipment and secure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



RS-232 COM I/O:

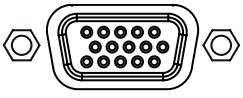
This 9P COM connector provides additional functionality for the unit. The Serial Remote Control features a RS-232 (non-isolated) interface for controlling internal parameters like brightness. You can access most of the parameters available in the OSD menu and with special commands control the unit externally. 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 only). Fasten your external cable to the D-SUB 9P Female connector using the provided screws on the cable housing.

Please review “Management Settings/Communication” in the “OSD Menu Functions” chapter for more information.



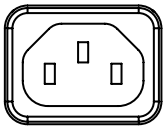
POTMETER INPUT / OUTPUT:

Allows for controlling Brightness of the displayed image on screen by connecting an external remote control to the 9P D-SUB (male) connector which has Potentiometer IN, +5VDC OUT and BRT +/- IN functionality built in. Review the “Pin Assignments” chapter in this manual for more information how to activate this functionality.



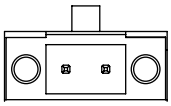
VGA/RGB OUT:

VGA/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.



POWER INPUT:

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



POWER INPUT:

Connect your DC power cable to the 2-pin Terminal Block 5.08 connector. The internal DC power module supports 24VDC. For more information, please review “Housing Connector Overview” earlier in this manual.

GROUNDING SCREW:

Please review “General Installation Chapter”, pt. 7 for more information.

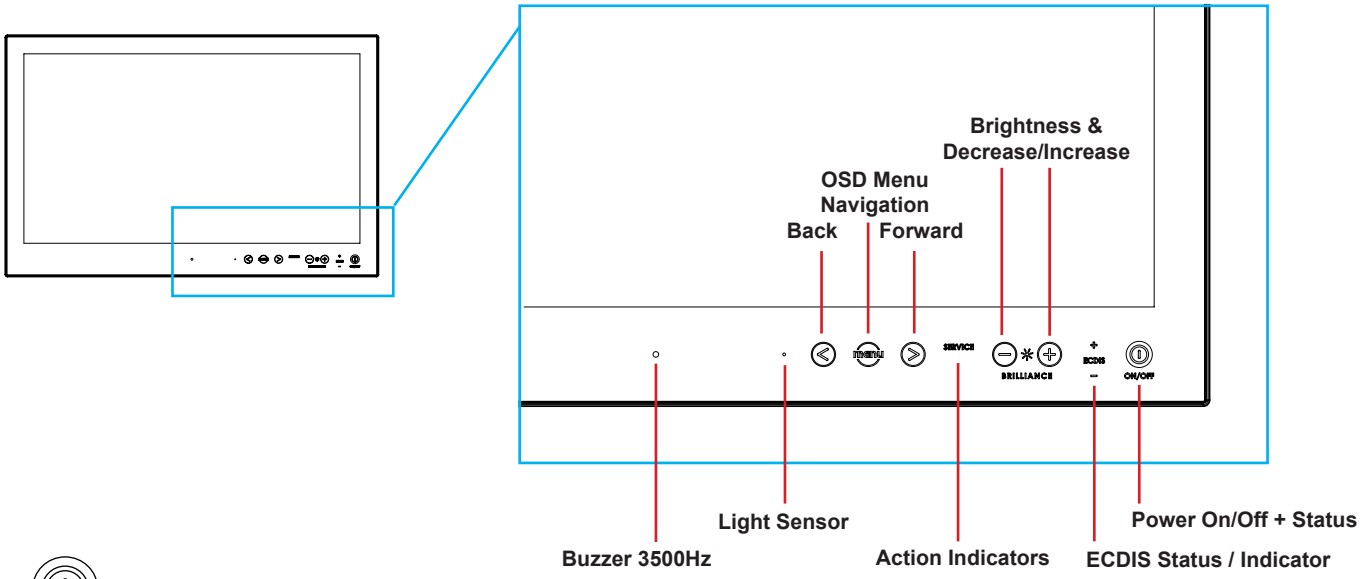
Multi-power note: (For units supporting AC & DC input simultaneously)

The unit has a dual input power supply which will accept both AC and DC input. If both inputs are connected, the unit will be powered by AC. If AC is disconnected it will automatically switch over to DC without affecting the operation of the unit. This makes it possible to use AC power as primary power and a 24V battery as secondary power, eliminating the need for expensive UPS systems.

Operation

USER CONTROLS OVERVIEW

The units are designed by using Glass Display Control™ (GDC) touch technology to allow interactivity adjusting brilliance (brightness) and control power on / off with the use of illuminated symbols. Note that these symbols are only visible (backlight illuminated) when suitable power is connected, except power symbol which has a white silk print to indicate its position on the front glass. Further, not all symbols are available depending on factory options and product sizes (where applicable). There is no physical moving knobs, potmeters, wheels or push buttons available as everything is touch surface controlled by Projected Capacitive technology that allows a human finger (including several types of gloves) to control the unit.



Power ON/OFF:

This symbol and all text will illuminate in red when suitable power is connected and the unit is turned off. When the unit is on and operating, this symbol will illuminate constantly either in yellow color (signal not recognized/not present and no image on screen) or green color (signal detected and image on screen).

Power ON:

To turn the unit on, verify that the symbol is illuminated in red (indicates suitable power is connected) and touch the power symbol and hold until the the symbol changes to green light/yellow light or a image appears on the screen.

Power OFF:

To turn the unit off, touch the power symbol and hold until it either illuminate/change from green/yellow to red or the image on screen disappears.

OSD Menu, Navigation:

If the OSD (On Screen Display) menu was activated (and is cleary visible on screen), both the “<” and “>” are used to navigate and set options within the OSD menu

To access the main OSD menu, touch anywhere on the “MENU” circle symbol and the OSD menu will clearly be seen as an overlay over the existing displayed image. The complete definition of all the menus and functions are available in the “OSD MENU FUNCTIONS” chapter in this manual.

User Controls

SERVICE **Action Indicators:**

SERVICE = Built in functionality to determine when the unit requires service in order to perform within preset factory standards. This area will illuminate constantly until the unit is powered off.
Note that by touching this symbol no action will be performed or has been assigned.

Brightness Adjust:

Brilliance / Brightness adjustment of the displayed image is adjusted by touching the (-) or (+) illuminated symbols. The entire area of text and symbols are visible as long as the unit is powered. Note that only the (-) and (+) are touch sensitive while the "*" and "BRILLIANCE" symbols are not. The symbols (-) and (+) are also used to change values in the OSD menu when its activated / function selected for adjusting.

ECDIS **ECDIS Status / Indicator:** (optional factory standard)

For units that has been factory ECDIS calibrated the text "ECDIS" will illuminate in green constantly as long as the unit is powered. The "+" and "-" symbols will illuminate in red when the Brightness/Brillance is adjusted either above or below ECDIS factory calibration point.

To be able to stay within ECDIS calibrated range, please assure that both the "+" and "-" are not illuminated in red color and that "ECDIS" text remains illuminated in green during operation. Note that by touching these symbols no action will be performed or has been assigned.

Note: ECDIS functionality is mostly only suitable for model sizes above 15 inch units.

Light Sensor:

Used to sense level of ambient light in the surrounding environment. The sensor data can be read by suitable software through the Hatteland Display SCOM functionality of the unit and thus can be used to control brightness remotely. Note: This sensor is barly visible for the eye and lies under the glass. It has no illumination behind to indicate it's position. Touching or covering this area will naturally make the sensor data inaccurate and should be avoided!

Buzzer:

Only functional for units ordered with Buzzer functionality. The location of the buzzer hole (physical hole in glass) is barely visible for the eye. Touching this area will naturally mute buzzer sound or in some cases make it lower or change audible frequency. In no circumstances should this area be blocked by either stickers or objects!
Please review the "Pinout Assignments" chapter in this manual for controlling the Buzzer functionality.

Note:
In the following "On Screen Display (OSD)" menu chapter, these buttons are referenced as:

menu	"MENU"
	"(-) Brilliance (+)"
	"(<) Navigation (>)"

OSD Menu Overview

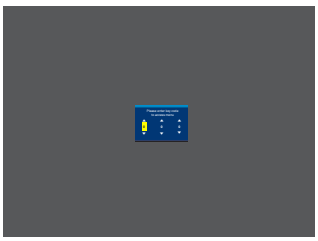
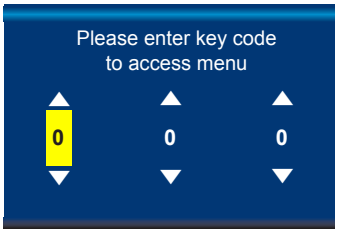
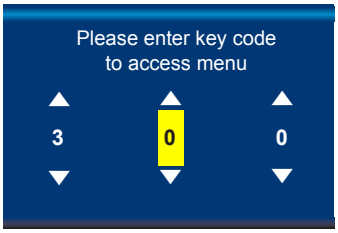
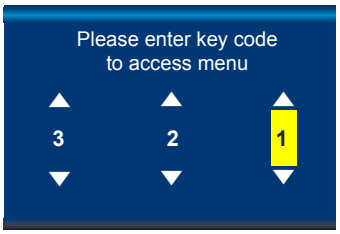
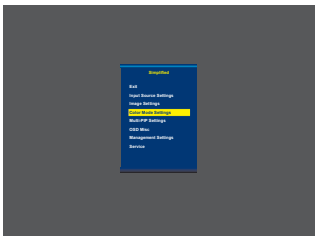
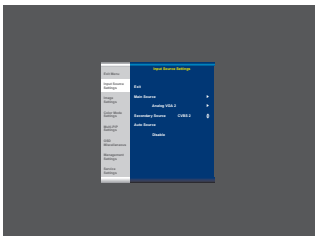
On Screen Display (OSD) Menu Introduction

The OSD menu consists of main menus and submenus which is very easy to navigate through. All functions are explained in-depth later in this user manual. You should prior to using the OSD menu and functions, be sure to familiarize yourself with how to physically access the menu, how to navigate up/down/left/right, how to modify values, exiting menus and more.

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 Keycode / OSD Lock Mode

During use, a small requester may pop-up on screen asking you for a “Key Code”. This is a safety feature (due to ECDIS Compliance) that might be predefined in your setup. To quickly understand how to enter a code, navigate and finally access the underlying main menu, simply follow the illustration below. The “Key Code” is by factory default **“321”**. If the “Key Code” requester do not appear on screen, you can skip reading this section for now and proceed to the next page.

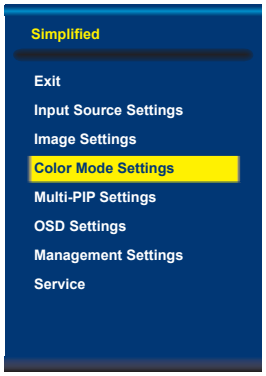
 Active Display Area + Requester	 Close-up of Requester	 Close-up of Requester
1: Typical position of requester on screen. Yellow box indicate number position, default loaction is always on first number.	2: Enter first number (from 0 to 9). Use “Navigation/Hot Keys” touch buttons to increase/decrease. Number change in real time.	3: Now touch menu button to store first number and proceed to second number. Yellow bar will move its position too.
 Close-up of Requester	 Active Display Area + OSD Menu	 Active Display Area + OSD Menu
4: Repeat step 2 and 3, until “Key Code” reads “3 2 1” and finally touch menu button to continue.	5: The OSD menu appear in “Simplified” mode (if confgured to do so)	6: The OSD menu appear in “Full” mode (if confgured to do so)

After the code was successfully entered you will gain access to the OSD Menu and a multitude of functions will be available for adjusting or reviewing. Please proceed to the next page, where you will learn the differences between “Simplified” and “Full” menu modes and a complete map of all the underlying functions available within.

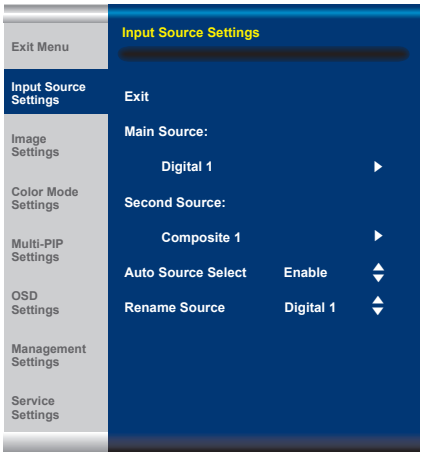
OSD Menu Overview

OSD Simplified and Full Menu modes (examples)

You may encounter two different menu size setups based on factory default or by customized preset configuration. The Simplified Menu mode offers easy and clear access to most commonly used functions. The Full Menu mode offers a more advanced menu with technical information and is suited for more technical minded users.



Simplified OSD Menu showing for example “Color Mode Settings” chosen in the menu. Each of these lines might have additional submenus where other lists of choices will be seen. The design and size of OSD menu area does not change.



Full OSD Menu showing for example “Input Source Settings” chosen in the menu. The left menu bar is visible at all times, while the right section will change based on contents of that submenu. The design and size of OSD menu area does not change.

OSD Visual Feedback (examples)

Throughout all OSD menus there are certain symbols you need to familiarize yourself with. These are to visually indicate that a value can be increased/decreased, accessed, display a Slide Bar Meter or just for information purposes only. All functions with arrows have text based, human readable lists with a start and end choices. A Slider Bar with number beside it will indicate the value has a minimum, current and max limit. All changes in values and lists happen in real time as you touch the menu button and/or touch navigation buttons.

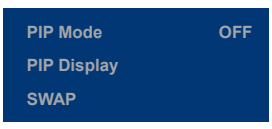
Arrow pointing right means that there is an submenu available for this function for further adjustments and functions.

Arrow pointing up/down means that the current choice can be changed in-place from a list that has a start and end.

Slider Bar meter indicates the “filling” up based on a minimum and maximum value. The current value is written to the left.

Whenever a function is selected, the item will be visually indicated with a yellow bar behind it. The other choices available will be in white text with no yellow bar behind.

Functions displayed in Green Color indicates either the current stored value of the function and sometimes to draw user’s attention towards information about an selected function or its current state.



Functions displayed in gray text means that set of functions may depend on a different option to be turned on or configured first. In this example, “PIP” functions are all unaccessible, since “PIP Mode” is “OFF”.

Note: The examples above are the most common ones displayed. Your menu may have slight different style and colors, depending on firmware, variations and customized solutions, but the logic of operation is the same.

OSD Menu Overview

OSD Menu Structure

In this table all functions within menus and their submenus are shown. Functions that begins with an asterix (*) and in **bold/red font color** style indicates this function/menu is only available during “Full” menu mode or during Video CVBS fullscreen. Functions with a “>” in the end, indicates a submenu or list of options will be displayed. Depth of the sub-menus (levels) are identified from 1 to 5.

Input Source Settings

Level 1 (Main Menu)	Level 2	Level 3	Level 4	Level 5
Exit				
Input Source Settings >	< Exit			
	Main Source >	< Exit		
		Digital 1, Digital 2, Analog RGB1, Analog RGB2, Composite 1, Composite 2, Composite 3	(Text Displayed)	
	Second Source >	< Exit		
		Digital 1, Digital 2, Analog RGB1, Analog RGB2, Composite 1, Composite 2, Composite 3	(Text Displayed)	
	Auto Source Select >	Enable, Disable		
	Rename Source >	<On Screen Keyboard Input>		

Image Settings

Level 1 (Main Menu)	Level 2	Level 3	Level 4	Level 5
Image Settings >	< Exit			
	Auto Position >	(Automatic Action)		
	Auto Color Balance >	(Automatic Action)		
	***Brightness >**	(Slider Bar)		
	***Contrast >**	(Slider Bar)		
	***Saturation >**	(Slider Bar)		
	***Hue >**	(Slider Bar)		
	Sharpness >	(Slider Bar)		
	Display >	< Exit		
		Horiz Position >	(Slider Bar)	
		Vertical Position >	(Slider Bar)	
		Clock >	(Slider Bar)	
		Phase >	(Slider Bar)	
	***Video Setup >**	< Exit		
		Main MADI Mode >	Normal, Adaptive, Off	
		Noise Reduction >	< Exit	
			Dynamic NR Mode >	High, Medium, Low, Adaptive, Off
			MPEG NR Mode >	On, Off
			Sharpness Noise Coring >	High, Medium, Low, Adaptive, Off
		Film Mode >	2:2, 3:2, 3:2-2:2, Off	
		DCDi >	On, Off	

Color Mode Settings

Level 1 (Main Menu)	Level 2	Level 3	Level 4	Level 5
Color Mode Settings >	< Exit			
	Color Temperature >	9300K, 8000K, 6500K >	(Automatic Action)	
		User >	< Exit	
			Red >	(Slider Bar)
			Green >	(Slider Bar)
			Blue >	(Slider Bar)
	*Gamma >	No Calibration, Calibration VGA, Calibration DVI		

Multi-PIP Settings

Level 1 (Main Menu)	Level 2	Level 3	Level 4	Level 5
Multi-PIP Settings >	< Exit			
	PIP Mode >	PIP Off, PIP Child, PIP Split, PIP Wide.		
	PIP Display >	< Exit		
		PIP Child Size >	< Exit	
			PIP Size >	(Slider Bar)
			PIP H-Size >	(Slider Bar)
			PIP V-Size >	(Slider Bar)
		PIP Position >	< Exit	
			PIP H-Position >	(Slider Bar)
			PIP V-Position >	(Slider Bar)
	Swap Source >	(Automatic Action)		
	PIP Picture >	< Exit		
		Brightness >	(Slider Bar)	
		Contrast >	(Slider Bar)	
		Saturation >	(Slider Bar)	
		Hue >	(Slider Bar)	
		Sharpness >	(Slider Bar)	

OSD Settings

Level 1 (Main Menu)	Level 2	Level 3	Level 4	Level 5
OSD Settings >	< Exit			
	OSD Position >	< Exit		
		OSD H Position >	(Slider Bar)	
		OSD V Position >	(Slider Bar)	
	Language >	< Exit		
		Norsk >	(Select for Norwegian)	
		English >	(Select for English)	
		Français >	(Select for French)	
		Deutsch >	(Select for German)	
		Italiano >	(Select for Italian)	
		Español >	(Select for Spanish)	
		日本語 >	(Select for Japanese)	
		簡體中文 >	(Select for Simplified Chinese)	
	Preset Save >	< Exit		
		Recall >	(Automatic Action) Performs Factory Defaults!	
		Save >	< Exit	
			User 1 to 5 >	(Automatic Action)
		Load >	< Exit	
			User 1 to 5 >	(Automatic Action)
	OSD Timeout (Sec) >	(Slider Bar)		
	OSD Transparent >	(Slider Bar)		
	OSD Mode >	< Exit		
		Simplified >	(Select)	
		Full >	(Select) and Enter Key Code “362”	
	OSD Lock Mode >	Normal Mode >	(Select)	
		Password Protect >	(Select) and Enter Key Code “321”	
		Full Mode >	(Select) and Enter Key Code “321”	
	OSD Key Outdoor >	< Exit		
		On >	(Select)	
		Off >	(Select)	
	Hot Key Assignment >	Key 1 >	Black Level, PIP Size, Main Source, Second Source, PIP Mode, Scaling, Swap Source, Test Pattern, LED Drive, Language, No Function	
		Key 2 >	Black Level, PIP Size, Main Source, Secondary Source, PIP Mode, Scaling, Swap Source, Test Pattern, LED Drive, Language, No Function	

Management Settings

Level 1 (Main Menu)	Level 2	Level 3	Level 4	Level 5
Management Settings >	< Exit			
	* Graphic Scaling >	< Exit		
		Graphic Scaling >	Full Screen, Fill to Aspect Ratio, 1:1	
		Zoom >	(Slider Bar)	
		Horizont Stretch >	(Slider Bar)	
		Vertical Stretch >	(Slider Bar)	
	Auto Adjustment >	On, Off		
	*Unknown Timing Search >	< Exit		
		Auto Mode >	< Exit	
			Display Size >	4:3, 5:4, 1:1, 16:9, 16:10
			Execute >	(Automatic Action)
		Blind Mode >	< Exit	
			Hor. Resolution >	(Slider Bar)
			Ver. Resolution >	(Slider Bar)
			Total Hor. Line >	(Slider Bar)
			Hor. Blank Pixels >	(Slider Bar)
			Ver. Blank Pixels >	(Slider Bar)
			Execute >	(Automatic Action)
		Save Timing >	Slot 1 to 8 >	(Automatic Action)
		Clear Timing >	Slot 1 to 8 >	(Automatic Action)
	LED Drive >	(Slider Bar)		
	*GDC Sensitivity >	(Slider Bar)		
	*Filter >	On, Off		
	*VGA Out >	Enable, Disable		
	*VGA SEL >	Enable, Disable		
	*Communication >	< Exit		
		RS232 >	(Select)	
		2-wire RS-485 >	(Select)	
		4-wire RS485/422 >	(Select)	
		Address RS >	(Slider Bar)	
		IP Address >	Auto IP >	(Select)
			Fixed IP >	(Number Input, xxx.xxx.xxx.xxx)
		Download >	(Automatic Action)	

Service Settings

Level 1 (Main Menu)	Level 2	Level 3	Level 4	Level 5
Service Settings >	< Exit			
	GEV Firmware Ver >	(Text Displayed)		
	CYP Firmware Ver >	(Text Displayed)		
	Ethernet Ver >	(Text Displayed)		
	Elapsed Time >	(Text Displayed)		
	Current Temp >	(Text Displayed)		
	Fault Status >	< Exit		
		DVI Chip >	(Text Displayed)	
		NVRAM >	(Text Displayed)	
		Ethernet >	(Text Displayed)	
		GDC >	(Text Displayed)	
		TMP Sensor >	(Text Displayed)	
	Test Pattern >	(Automatic Action)		
	Burn In >	ON, OFF		

On Screen Display (OSD) Menu Functions

The following section covers all possible settings that the user can (in a certain mode) encounter or needs to adjust via easy understandable menus, text and navigation. For simpler reading the menu choice **“Exit”** has been left out of description in this chapter intentionally. Whenever **“Exit”** is available, you can exit current menu and go back to the previous one visited. When there is no more previous menus available, the OSD menu overlay will be shut off and hidden. All settings are saved real-time or when you exit a menu (including time out of menu visibility).

The number shown in the “|------x------” line gives the indication of the submenu level where the function is located (also reference to the table in the previous chapter). It requires the user to touch the “MENU” symbol to enter that submenu.

Please note: Available functions described may deviate slightly from actual OSD menu on your unit. This is due to different OSD software configurations and customized solutions. Shown here are factory standards.

Input Source Settings

Lets you configure Main and Secondary signal source inputs (DVI, VGA or Composite video signals) as well as activate or disable the Auto Source functionality. The contents of these submenus are listed below.

|---2--- **Input Source Settings - Main Source**

The possible signal inputs are; “Digital 1” (DVI), “Digital 2” (DVI), “Analog VGA1” (RGB/VGA), “Analog VGA2” (RGB/VGA), “Composite 1”, “Composite 2” and “Composite 3” (Composite Video). Video inputs supports standard PAL/NTSC/SECAM signals.

- Note: The current active main source name will be greyed out in the list. By factory default, “Digital 1” (DVI) are assigned as Main Source. The current active main source will be shown in green color at the bottom of this menu.

|---2--- **Input Source Settings - Second Source**

The possible signal inputs are; “Digital 1” (DVI), “Digital 2” (DVI), “Analog VGA1” (RGB/VGA), “Analog VGA2” (RGB/VGA), “Composite 1”, “Composite 2” and “Composite 3” (Composite Video). Video inputs supports standard PAL/NTSC/SECAM signals.

- Note: The current active secondary source name will be greyed out in the list. Also, if VGA or DVI are defined as Main Source, they cannot be re-selected as second source as well. The second source is used together with Main Source for the Picture-in-Picture (PIP) functionality. PIP works only with one source of DVI/VGA together with Composite Video sources. By Factory default the second source is unassigned. The current active main source will be shown in green color at the bottom of this menu.

|---2--- **Input Source Settings - Auto Source Select**

Set to either ‘Enable’ or ‘Disable’. Signal is automatically searched for and selected. If the Main Source signal is disconnected physically, the video controller will automatically search and select from the next item available in the list, such as; “Digital 1” (DVI), “Digital 2” (DVI), “Analog VGA1” (RGB/VGA), “Analog VGA2” (RGB/VGA), “Composite 1”, “Composite 2” and “Composite 3” (Composite Video).

- Note: If all signals was physically disconnected from the unit, the Auto Source function will loop endlessly until it detects a valid signal to display.

|---2--- **Input Source Settings - Rename Source**

By factory default, every signal source input are named based on it's signal property as described in the previous functions, but with the rename source function you can rename these into more understandable descriptions like; "FRONT-CAMERA", "NIGHT RADAR" etc.

When activated, a requester on screen similar to a standard keyboard layout will appear.
Use the "(-) Brilliance (+)", "(<) Navigation (>)" and "MENU" touch buttons to enter and edit the new name. Below is an example for editing the "Source" input name. Only uppercased letters allowed.

The "|<" button will erase (backspace) the last character entered. Press "Enter" to save new name.

Yellow border around letter indicate selected character.

Image Settings

Lets you configure various visual preferences for any signal. The contents of these submenu are listed below.

|---2--- Image Settings - Auto Position

Will automatically fit the current displayed full screen signal and center it based on the active area of the TFT display. This function rely on properties of the incoming signal.

- Note: This function will not try to scale or deform the image, so if the image looks stretched, please review the Management Setting/Scaling function later in this manual to adjust it on pixel level. Available for RGB/VGA mode only.

|---2--- Image Settings - Auto Color Balance

Will automatically adjust the color balance of the current displayed full screen signal. This function will analyse the incoming signal strength for RGB values and adjust it for “best eye visuality”. Colors are automatically calculated based on a overall coloring model to attempt a more true, relevant and correct look. In general, you should display a image on screen while performing this action that contains variations of Red, Green, Blue, Black, White, Gray colors to get the best optimal balance of the current signal. An example is a test pattern image, similar to the picture illustrated later in the manual (see “Service - Test Pattern”)

- Note: Available for RGB/VGA mode only.

|---2--- Image Settings - Brightness *Available in “Full Mode” only

Increase/decrease the black level saturation in real-time of the current displayed full screen signal. Window overlays (PIP/PBP) and the OSD Menu overlay will be unaffected. A visual slider in the OSD menu will show the current value. This value adjusts the TFT panel’s brightness by controlling the voltage feed.

- Note: Value adjustable from 0 to 100. 50 is factory default.

|---2--- Image Settings - Contrast *Available in “Full Mode” only

Increase/decrease the contrast in real-time of the current displayed full screen signal. Window overlays (PIP/PBP) and the OSD Menu overlay will be unaffected.

- Note: Value adjustable from 0 to 100. 50 is factory default.

|---2--- Image Settings - Saturation *Available in “Full Mode” only + Video Fullscreen

Increase/decrease the overall video color saturation/color amount of the current displayed full screen image (no effect on DVI/VGA signals). Can be used if the incoming CVBS signal from older equipment (due to bad cables) appear to have a lack of strong colors or just to generally make the displayed image become more vivid. Note that this function can also make noisy color signals appear crisper/clearer if adjusted to gray scales.

- Note: Value adjustable from 0 to 100. 50 is factory default.

|---2--- **Image Settings - Hue** ***Available in "Full Mode" only + Video Fullscreen**

Allows to adjust/shift the main color properties of all Red, Green, Blue and Yellow (unique hues) values. This can be useful for certain Composite Video sources (no effect on DVI/VGA signals) whose output may have shifted or seems to be "out of phase", where for instance blue seems more dominant than green, red and yellow-ish colors. By using HUE one can shift the entire color range of all components left or right in the spectrum.

- Note: Value adjustable from 0 to 100. 50 is factory default.

|---2--- **Image Settings - Sharpness**

Increase/decrease the overall image sharpness. This affects the active display area, 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 improve electronically weak signals.

- Note: Value adjustable from 0 to 24. 12 is factory default. Available for RGB/VGA, CVBS modes only.

|---2--- **Image Settings - Display**

Allows to adjust DVI/VGA signals Horizontally (left/right) and Vertically (up/down) within the TFT panel Active Area. If the incoming signal is "Analog VGA 1 (RGB/VGA)" only, Clock and Phase can also be adjusted (if there seems to be a "waterfall / rolling bars" effect present in the active display area).

- Note: This function can move information in the image outside the visible TFT Active Area, so use caution when modifying this parameter. Try to determine the max end of borders (look at each corner) of the image before you proceed using this function.

|--------3-------- **Image Settings - Display - H Position**

Settings as follows:

"H Position" = Move image within the TFT panel active area Horizontally (left/right), values from 0 to 100.

- Note: Default value is centered inside the active TFT panel area.

|--------3-------- **Image Settings - Display - V Position**

Settings as follows:

"V.Position" = Move image within the TFT panel active area Vertically (up/down), values from 0 to 100.

- Note: Default value is centered inside the active TFT panel area.

|--------3--------

Image Settings - Display - Clock

Adjust the horizontal frequency (clock) 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.

To adjust the Clock and Phase to a optimal setting it is recommended to display a image with alternating white and black lines by stepped by 1 pixels either vertically or horizontally. It is suggested to use a dedicated and external test pattern while adjusting.

- Note: Available for RGB/VGA mode only.

|--------3--------

Image Settings - Display - Phase

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). Note that this function is automatic and does not allow for manual values. It is suggested to use a dedicated and external test pattern while adjusting.

- Note: Available for RGB/VGA mode only.

|---2--- **Image Settings - Video Setup** ***Available when Video Fullscreen only**

Provides submenus where the following settings for Composite video signals are available:

|--------3-------- **Image Settings - Video Setup - Main MADI mode**

Motion Adaptive De-Interlacing. Motion adaptive de-interlacing is a pixel-based two-phase process. Phase 1 involves the detection of motion and the generation of a motion value for each pixel. These pixel motion values are used as a measure of the current “degree of motion”. In Phase 2, the pixel motion values are used to select the appropriate de-interlacing technique. As a result, areas of an image that are not moving will be fully static (flicker free) and moving objects will have smooth edges.

Set to either “Normal”, “Adaptive” or “OFF”.

- Note: Default is OFF

|--------3-------- **Image Settings - Video Setup - Noise Reduction**

The media noise reduction block removes unwanted ringing and block noise from images that have undergone MPEG or JPEG compression and decompression. The two types of media noise that can be reduced are:

- Block Noise: MPEG encoders, in the presence of an almost flat area, can create a squared structure due to the discrete 8x8 squares that are used in the MPEG compression process. This creates a noticeable squared structure in the image. The process smoothens these square boundaries so they are not visible. The amount of smoothening is programmable between neighboring pixel values that will be smoothened. The amount of smoothening starts to decrease linearly from the maximum (defined by TO) to 0 (defined by 2 x TO) to avoid the hard switch effect of the smoothening applied.

- Mosquito Noise: This process smoothenes checker box and discrete noise artifacts referred to as Mosquito Noise around large edge transitions caused by MPEG encoders.

This submenu will give you the following choices:

|----------4---------- **Image Settings - Video Setup - Noise Reduction - Dynamic NR Mode**

Dynamic NR (Noise Reduction) Mode can be set to either “High”, “Medium”, “Low”, “Adaptive” or “OFF”. This is the “strength” of how much noise to detect and automatically remove in order to enhance the overall image quality. The Block Noise process will be used.

- Note: Default is OFF

|----------4---------- **Image Settings - Video Setup - Noise Reduction - MPEG NR Mode**

MPEG NR (the generic coding of moving pictures and associated audio information) can be set to either “ON” or “OFF”. This function will try to reduce noise as result from compressed/formatted MPEG video streams. This noise is often seen as larger blocks or containers of compressed pixels and is suitable to improve the visual performance of video feeds capable of outputting direct MPEG streams. The Block Noise process will be used.

- Note: Default is OFF

|----------4---------- **Image Settings - Video Setup - Noise Reduction - Sharpness Noise Coring**

Adjust the clarity after Noise Reduction was applied to the video signal. Can be set to “High”, “Medium”, “Low”, “Adaptive” or “OFF”. The Mosquito Noise will be used.

- Note: Default is OFF

|--------3-------- **Image Settings - Video Setup - Film Mode**

This function will analyze the resolution and frames per second information in the video feed and determine how to process/display each frame correctly (to avoid judder and staggering playback), also referenced as “pull down method”. This option should be chosen to secure that the video feed is at maximum quality and performance. 2:2 is suitable for PAL/SECAM signals, while 2:3 is suitable for NTSC signals. 2:2-2:3 will try to conform to both standards and may be suited in some cases for mixed incoming video feeds.

3:2 film enables sequences of 24 Hz original film content and convert this to an output of 48 Hz or 72 Hz vertical refresh rate. This feature reduces the noticeable uneven judder seen on a 3:2 film sequence that is converted to 60 Hz vertical refresh rate.

Set to either; “2:2”, “3:2”, “3:2-2:2” or “OFF”.

|--------3-------- **Image Settings - Video Setup - DCDi**

DCDI® BY Faroudja low-angle Diagonal interpolation. In addition to the advanced de-interlacing capabilities mentioned in the previous sections, further image enhancement is achieved by applying special processing to a moving lowangle diagonal pattern in a video image. For motion video, the intra-field interpolation is done using the patented and highly acclaimed DCDI® (Directional Correlational De-Interlacing) algorithm by Faroudja®. Conventional Interpolation algorithms operate on the basis that the current pixel is related to the pixels above and below it. This is untrue of diagonal edges. Whenever an edge is not vertical, the way the current pixel depends on the angle of the edge is related to those diagonally above and below it. Hence, conventional vertical Interpolation algorithms work well on edges close to the horizontal and vertical directions. However, they will break down completely as the angles of edges become more diagonal, causing jagged edge artifacts. DCDi® by Faroudja computes and tracks the angles of edges and uses this information to optimally fill in the missing pixels, removing jagged edge artifacts.

Set to either “ON” or “OFF”.

Color Mode Settings

Lets you adjust the color temperature (Kelvin degrees) of the image. This applies to the Main Source signal. Window overlays (PIP/PBP) and the OSD Menu overlay will be unaffected. Lower values make the image appear warmer, while higher values will make it appear cooler. The contents of these submenus are listed below.

Illustration (does not appear in menu): The Kelvin color temperature scale (approximate and symbolic):

|---2--- **Color Mode Settings - Color Temperature**

Set to either “9300K” (Cool, a blueish white), “8000K” (Neutral, a white close to natural light), “6500K” (Warn, a reddish white) or “User”, (only available when Full Menu is active).

|--------3-------- **Color Mode Settings - Color Temperature - User**

Allows individual adjustment of Red, Green and Blue color gains. The selected setting will be preserved for each signal input (DVI/RGB/CVBS...)

- Note: Value adjustable from 0 to 100. 50 is factory default.

|---2--- **Color Mode Settings - Gamma** ***Available in “Full Mode” only + Video Fullscreen**

This will activate the stored gamma curve color compensation as well as the LED indicators or backlight brilliance used with ECDIS. Set to either “No Calibration”, “Calibration VGA” or “Calibration DVI”, where these represents the two storage locations for compensation data. When either of them are active, they will override the color temperature setting for the signal channel. Different signal channels can be set to different settings that will be preserved.

This function is suitable for use with external equipment. Color temperature will be disabled.

- Note: Default is No Calibration with Gamma 2.2 and 140nits.

Multi-PIP Settings

Lets you adjust how the Picture-in-Picture (PIP) or Picture-by-Picture (PBP) display mode is set up. The default position of the rectangle is set to upper left corner of the Active Display area. Note that this requires a valid incoming signal to be present in either the VGA or CVBS inputs. The contents of these submenus are listed below.

|---2--- Multi-PIP Settings - PIP Mode

Settings as follows:

"PIP OFF" = Picture in Picture is inactive and the other PIP settings can not be accessed.

"PIP Child" = The Secondary Source will be displayed in a small frame as an overlay over the Main Source signal. When this function is activated a new menu item will appear under "PIP Mode" called "PIP Display".

"PIP Split" = The Main Source and Secondary signal sources are shown side-by-side with the Main Source to the left and the Secondary Source to the right. Note that only 50% of each source is actually visible on screen (split in two). When this function is activated a new menu item will appear under "PIP Mode" called "PIP Display".

"PIP Wide" = The Main Source and Secondary signal sources are shown side-by-side in widescreen mode with the Main Source to the left and the Secondary to the right. When this function is activated a new menu item will appear under "PIP Mode" called "PIP Display".

- Note: Default is OFF

|---2--- Multi-PIP Settings - PIP Display *Available only when PIP Mode on

When PIP Child mode is active, the size and position of the rectangle displaying the Secondary Source can be adjusted via the submenus below.

|--------3-------- Multi-PIP Settings - PIP Display -- PIP Child Size

Settings as follows:

"PIP Size" = Adjust the full size (H and V) for Secondary Source, values from 0 to 7.

"PIP H-Size" = Adjust the Horizontal size for Secondary Source, values from -10 to +10.

"PIP V-Size" = Adjust the Vertical size for Secondary Source, values from -10 to +10.

- Note: Default value for all 3 functions is 0.

|--------3--------

Multi-PIP Settings - PIP Position

When PIP Child mode is active, the size and position of the frame displaying the Secondary Source can be adjusted by means of submenus for size and position respectively below.

Settings as follows:

"PIP H-Position" = Adjust the Horizontal (left/right) position for Secondary Source, values from 0 to 100.

"PIP V-Position" = Adjust the Vertical (up/down) position for Secondary Source, values from 0 to 100.

- Note: Default value for both functions is 0.

|---2---

Multi-PIP Settings - Swap Source

Swaps the Main and Secondary source signals (if present) including adjustments you may have made, meaning that whatever is in Main Source will become the contents of the defined PIP rectangle, and contents of the PIP rectangle to become full screen.

|---2---

Multi-PIP Settings - PIP Picture

When PIP mode is active, the picture appearance of the Secondary Source can be adjusted via the following settings:

Settings as follows:

"Brightness" = Adjust the black level (brightness) of the Secondary Source, values from 0 to 100. Default is 50.

"Contrast" = Adjust the contrast of the Secondary Source, values from 0 to 100. Default is 50.

"Saturation" = Adjust the overall color intensity of the Secondary Source, values from 0 to 100. Default is 50

"Hue" = Adjust the Hue color properties of the Secondary Source, values from 0 to 100. Default is 50.

"Sharpness" = Adjust the sharpness of the Secondary Source, values from 0 to 24. Default is 12.

OSD Settings

Allows you to customize the visual appearance of the On Screen Display (OSD) menu, such as; position, transparency, time-out, assign hot keys, define access modes and save, load and recall favourite settings and more. The contents of these submenus are listed below.

|---2--- OSD Settings - OSD Position

Settings as follows:

"OSD H Position" = Place the OSD menu overlay Horizontally (left/right), values from 0 to 100.

"OSD V Position" = Place the OSD menu overlay Vertically (up/down), values from 0 to 100.

● Note: Default position of the OSD menu overlay is in the lower left corner of the of the Active Display area. Default value for both functions is 100.

|---2--- OSD Settings - Language

Available OSD language to be used for all text and warnings that may appear.

Settings as follows:

"Norsk" = Display OSD in Norwegian.
"English" = Display OSD in English.
"Français" = Display OSD in French.
"Deutsch" = Display OSD in German.
"Italiano" = Display OSD in Italian.
"Español" = Display OSD in Spanish.
"日本語" = Display OSD in Japanese.
"簡體中文" = Display OSD in Simplified Chinese.

● Note: Current selected language is shown in green color. Default language is English.

|---2--- OSD Settings - Preset Save

Allow to work with Memory Presets (Recall/Save/Load) for OSD menu settings and overlays. The contents of the submenu is listed below.

Settings as follows:

"Recall" = Reset back to factory defaults. Will override and restore all previous modified settings.

|--------3--------

OSD Settings - Preset Save - Save

Allows to save current state of all function and values to user defined presets. The contents of the submenu is listed below.

Settings as follows:

“User 1”	= Save all OSD settings to User 1 slot.
“User 2”	= Save all OSD settings to User 2 slot.
“User 3”	= Save all OSD settings to User 3 slot.
“User 4”	= Save all OSD settings to User 4 slot.
“User 5”	= Save all OSD settings to User 5 slot.

|--------3--------

OSD Settings - Preset Save - Load

Allows to load current state of all function and values to user defined presets. The contents of the submenu is listed below.

Settings as follows:

“User 1”	= Load all OSD settings from User 1 slot.
“User 2”	= Load all OSD settings from User 2 slot.
“User 3”	= Load all OSD settings from User 3 slot.
“User 4”	= Load all OSD settings from User 4 slot.
“User 5”	= Load all OSD settings from User 5 slot.

|---2---

OSD Settings - OSD Timer

Adjust the timeout in seconds that the OSD menu overlay is automatically exited and hidden from view including locking mode (see OSD Lock Mode/Full Mode on next page). This timeout is counted from last activity (navigation or adjusting parameters). The value is adjustable from 0 to 30 seconds.

- Note: Default timeout value is 10 seconds.

|---2---

OSD Settings - Transparent

Adjust the alpha blend also known as transparency of the OSD Menu overlay. It means that all signal inputs and PIP/PBP images show through the OSD Menu. It is used when important information on the display is necessary to be visible at all times.

- Note: Level adjustable from 0 to 7. 0 is factory default (no transparency/solid background color).

|---2--- OSD Settings - OSD Mode

Configuring the OSD Mode to show as simplified/most common functions or advanced (full) setup.

Settings as follows:

"Simplified" = A few functions is not visible/available in this state. For most uses this is the preferred setting and are safe for the display functionality and continuous trusted operation on the unit.

"Full" = All functions and parameters is visible/available in this state. Some of the settings adjusted could impact on display functionality and image quality. Only experienced and qualified personnel should access and change parameters when in this mode. Also, more technical details about signals, frequency will be available. The layout of the OSD menu will also change to a slightly bigger window with more menus and functions available.

- Note: Learn how to navigate and enter the correct code, by reading the "OSD Keycode / OSD Lock Mode" introduction section earlier in this chapter.

- Note: When requesting a "Full" mode from a Simplified mode, the user are required to enter a key code. This code is factory preset to "362". You can enter the code by using navigation and "MENU" to confirm. After a successful entering of the key code, the OSD menu will always be in this state during powered on. After a power off and on to the unit, the OSD Mode will be reverted back to "Simplified" mode.

|---2--- OSD Settings - OSD Lock Mode

To prevent accidental or unwanted user intervention, you can set the behaviour of how the OSD menu is accessible by the user including adjusting brightness via the "(-) Brilliance (+)" symbols. Normally by factory default accessible by touching the "MENU" symbol on the front glass of the unit.

Settings as follows:

"Normal Mode" = Default accessible pop-up by touching the "MENU" symbol. For Non-ECDIS Compliant usage.

"Password Protect" = Ask for key code first (321) when the "MENU" symbol is touched on the front glass and before the OSD menu will appear. Required for ECDIS Compliance usage.

"Full Mode" = When activated: You will have to touch the "MENU" symbol for 5 seconds after which the key code requester will appear. Note that only the "MENU" symbol will activate the password request, all other touches on other symbols are ignored. After key code was entered and accepted, the OSD menu will appear in which case you have **"x"** seconds to use brilliance and power functions before all functions are deactivated again and returns to "Full Mode".

"x" value is defined as OSD Timeout value (see previous page).

- Note: Learn how to navigate and enter the correct code, by reading the "OSD Keycode / OSD Lock Mode" introduction section earlier in this chapter.

|---2--- OSD Settings - OSD Key Outdoor

To prevent accidental activation of Glass Display Control™ (GDC) touch functions, you can add an extra layer of security on how “sensitve” the touch detection operates. This applies for “MENU”, “(-) Brilliance (+)” and “Power Off” functions. The OSD Key Outdoor function is especially effective if the unit is located in a outside environment where rain drops could potentionally trigger touch button functions. Note that this setting does not apply for fullscreen sized touch screen glasses.

Settings as follows:

“Off”	= All touch symbols operates normally.
“On”	= Touch symbols responds when you press and hold it for 5 seconds.

|---2--- OSD Settings - Hot Key Assignment

Assign a commonly used OSD menu function to the available touch enabled Hot Keys which is located on the front display glass. The following functions are available to assign and most of them have a negative and positive counting logic. All of these functions are described before and after this segment in the manual.

Settings as follows (for both “Key 1” and “Key 2”):

“Brightness”	= Increase/Decrease Brightness of the TFT panel (not backlight).
“PIP Size”	= Increase/Decrease the size of the Picture-In-Picture overlay.
“Main Source”	= Flip up/down through the available signal sources (to full screen).
“Second Source”	= Flip up/down through the available signal sources (to PIP/PBP).
“PIP Mode“	= Flip up/down through the PIP/PBP functions.
“Scaling”	= Flip up/down through the scaling methods (Full, 1:1, Fill Aspect)
“Swap Source”	= Swap the Main Source and Secondary Source appearance. Both Hot Keys performs the same action.
“Test Pattern”	= Display the internal test image overriding any signal inputs. Both Hot Keys performs the same action.
“LED Drive”	= Increase/Decrease the voltage level controlling LED Backlight which affects the overall brightness strength (not via TFT panel itself).
“Language”	= Flip up/down through available languages (real-time changes).
“No Function”	= Nothing will be activated when user touches Hot Keys on front glass. Both Hot Keys performs the same action.

- Note:Default Hot Keys are assigned to “No Function”. You can assign different functions to “Key 1“ and “Key 2”.

Management Settings

Allows you to adjust overall settings for interaction/communication for the unit, such as scaling, zoom, timing of signals, adjust voltages for LED (which illuminate the front glass symbols), sensitivity for the touch control, VGA filter and Serial/Ethernet communication and more. The contents of these submenus are listed below.

|---2--- Management Settings - Graphic Scaling *Available in "Full Mode" only

Allow to scale the currently displayed full screen signal in various ways. The contents of the submenus is listed below.

|--------3-------- Management Settings - Graphic Scaling - Scaling

All scaling will performed from center of active display area and outwards in all directions.

Settings as follows:

"Fill Screen" = Zoom current full screen signal to fill the entire active display area. Aspect ratio is ignored, which means that picture may appear distorted or stretched.

"Fill to Aspect Ratio" = Zoom current full screen signal to fill the entire active display area and preserve the aspect ratio. This means that you may notice black bars without any image information either on top/bottom or left/right of the centered image.

"1:1" = Zoom current full screen signal to fill the entire active display area as 1:1 native pixel resolution. Example; if the incoming signal is a 800x600, on a 1600x1200 unit, the incoming signal will be shown 50% less in size and centered on screen. Aspect ratio is kept unchanged.

|--------3-------- Management Settings - Scaling - Zoom

All zooming will performed from center of active display area and outwards in all directions.

Settings as follows:

"Zoom" = Zoom the current full screen signal horizontally and vertically in equal steps. Values from 0 to 100.

- Note: Values under or over 50, may cause blurry and unfocused imagery, since it overrides the external signal's 1.1 pixel information and properties. Default value is 50.

|--------3--------

Management Settings - Graphic Scaling - Horizont Stretch

All stretching will performed from center of active display area and outwards in one direction.

Settings as follows:

"Horizont Stretch" = Zoom/stretch current full screen signal in Horizontal direction only (left and right). Values from 0 to 100.

- Note: Values under or over 50, may cause blurry and unfocused imagery, since it overrides the external signal's 1.1 pixel information and properties. Default value is 50.

|--------3--------

Management Settings - Graphic Scaling - Vertical Stretch

All stretch will performed from center of active display area and outwards in one direction.

Settings as follows:

"Vertical Stretch" = Zoom/stretch current full screen signal in Vertical direction only (up and down). Values from 0 to 100.

- Note: Values under or over 50, may cause blurry and unfocused imagery, since it overrides the external signal's 1.1 pixel information and properties. Default value is 50.

|---2---

Management Settings - Auto Adjustment

Allow to let the video controller always perfom a Automatic Adjustment based on the detected properties in the incoming signal or when incoming signal sources changes it's properties real time. It will scale and position incoming signal sources that has changed since the last detection was executed successfully. Set to either "ON" or "OFF".

- Note: This function is the same as the manual function found in "Image Settings - Auto Position" earlier described. Default value is "OFF".

|---2--- **Management Settings - Unknown Timing Search** ***Available in "Full Mode" only**

Use this if you are unable to find or detect the incoming full screen signal automatically (applies for Analog VGA and CVBS video signals only. A PIP or PBP configured signal is not supported). It may be a customized signal regarding resolution and refresh frequency. In these situations the custom signal sources can be searched upon or entered manually within the OSD menu and even stored conveniently. The contents of these submenus are listed below.

|--------3-------- **Management Settings - Unknown Timing Search - Auto Mode**

Try to determine the incoming signal by automatic detection routines which is based on a known list of properties for resolutions and frequency combinations that fall out, but between the most common industry standard set of resolutions/refresh frequencies.

Settings as follows:

"Display Size" = Force the Aspect Ratio to either to 4:3, 5:4, 1:1, 16:9 or 16:10

"Execute" = Choose to produce timing table, update the "Blind Mode Data" and refresh the screen condition using the data of the timing table. If this procedure seem to fail, use the "Blind Mode" below to enter values manually.

|--------3-------- **Management Settings - Unknown Timing Search - Blind Mode**

If you know the advanced properties of the incoming signal or want to troubleshoot a possible detected signal (that seem to have small deviations), you may try to adjust the values below and see the result in real time. These settings should be performed by a skilled technician or a individual that has the needed knowledge to do so. Internally these settings below are saved into a data register called "Timing Table".

Settings as follows:

"Hor. Resolution" = Set the Horizontal resolution of the timing table.
"Ver. Resolution" = Set the Vertical resolution of the timing table.

"Total Hor. Line" = Set the Total Horizontal Lines of the timing table.

"Hor. Blank Pixels" = Set the Horizontal Start of timing table, (sync pulse + back porch).

"Ver. Blank Pixels" = Set the Vertical Start of timing table, (sync pulse + back porch).

"Execute" = Choose to produce timing table and refresh the screen condition using the data of the timing table.

- Note: You may experience fast, slow flickering or sliding lines during adjustments. This is normal, and gives the indication that a different setting may have to be adjusted also, since all these functions are connected to each other in order to create a stable signal that the video controller can display correctly.

|--------3--------

Management Settings - Unknown Timing Search - Save Timing

The current “Timing Table Data” that is currently visible in the “Blind Mode” or via the “Auto Mode” functions may now be saved to a user defined slot. Available save slots from 1 to 8. Saving “Time Table Data” may prove to be useful until the external equipment is either replaced or changed. If so, you should use the “Clear Timing” function below to remove any obsoleted “Timing Table Data” from time to time. Default save slot is 1.

|--------3--------

Management Settings - Unknown Timing Search - Clear Timing

Will allow to clear “Timing Table Data” currently saved / or not saved, based on the “Save Timing” function above. You may clear save slots 1 to 8. Default chosen is 1.

|---2---

Management Settings - LED Drive

The touch enabled symbols available on the front glass of the unit is backlight illuminated by LED technology. If you have the need to adjust the brightness strength of these LED (to conform with Night Vision situations), you may do so by adjusting this value in real time.

Settings as follows:

“LED Drive” = Adjust values from 0 to 31.

- Note: Default is 31

|---2---

Management Settings - GDC Sensitivity *Available in “Full Mode” only

The touch enabled symbols known as GDC (Glass Display Control™) available on the front glass of the unit can be adjusted in sensitivity. It basically means that a small value requires a larger area to be covered longer over time, while a large value will require less smaller area to be covered in less time. If you set the value too low or too high, you may feel a difference in either increased responsiveness or the lack of such. By factory default, the most optimal value has been preset.

Settings as follows:

“GDC Sensitivity” = Adjust values from 0 to 100.

- Note: Default is model dependent and set by factory. Note that the difference between 0 and 100 is minimal, as it is not suitable to go beyond a fair responsiveness that could cause accidental triggering of functions to occur by nearby objects touching the glass (i.e. rain drops for instance, washing glass with cloth).

- Caution: If the sensitivity value was set very low, you may experience a increased occurence of non-responsiveness which also affects accessing the correct menu function in order to re-adjust this value. It is therefore suggested as a last resort solution to reset this value via SCOM (Serial/Ethernet Communication) functionality instead by sending a “Reset Factory Default” (or “Load User Default”+Slot Number, if available and previously stored by using “Save User Default”+Slot Number) commands if you are unable to navigate the OSD menu.

  Please review the appropriate Technical User Manual located here:
  http://www.hatteland-display.com/pdflink/inb100018-4.php

|---2--- **Management Settings - Filter** *Available in “Full Mode” only

Filter (applies for VGA1 signal input only) 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.

Settings as follows:

“Filter” = Set to either “ON” or “OFF”.

- Note: Default is “OFF”

|---2--- **Management Settings - VGA Out** *Available in “Full Mode” only

Set to either “Enable” or “Disable”. More information available later.

|---2--- **Management Settings - VGA Sel** *Available in “Full Mode” only

Set to either “Enable” or “Disable”. More information available later.

|---2--- Management Settings - Communication *Available in “Full Mode” only

The unit allows for remote control (adjust brightness for example) and/or accessing internal information about the unit such as typenumber, serial number and more. To setup this feature, you first need to configure the Serial or Ethernet protocol properly to match your external equipment specifications. The contents of the submenus is listed below.

Settings as follows:

“RS232”	= Sets the internal communication to standard RS-232 protocol.
“2-wire RS-485”	= Sets the internal communication to RS-485 protocol (Half duplex).
“4-wire RS485/422”	= Sets the internal communication to RS-485/422 protocol (Full duplex).
“Address RS”	= Set the global unique channel/port ID for the unit, 16 ID’s available.
“IP Address”	= IP can be found Automatically or you can set the IP address manually (xxx.xxx.xxx.xxx) for Ethernet protocol by choosing “Fixed IP”.
“Download”	= Allows Factory Firmware upgrade for the unit via RS-232 Serial Communication.

- Note: Default mode is “RS232” protocol.

A more detailed description of the SCOM (Serial/Ethernet Communication) can be found here:
http://www.hatteland-display.com/pdflink/inb100018-4.php
Review also the “Pinout Assignments” chapter in this manual for additional help during preperation and/or installation of external equipment intended to communicate with.

Service

Will show various technical and unit related information, such as; Firmware versions, Elapsed Time, Internal Temperature, Fault Status and activation for the internal Test Pattern image useful for trouble-shooting. Some of these functions are static information while others are accessible. Whenever you are in contact with helpdesk or service personnel, they might require you to read back some of these values in order to precisely pinpoint any problem/question you should have with the unit or its functionality.

Information blocks as follows:

“GEV Firmware Rev”	= Displays the firmware version of the GEV videocontroller. Example: “GEVHD-24 120120V2”
“CYP Firmware Rev”	= Displays the firmware version of the touch enabled buttons. Example: “120119R0V01”
“Ethernet Firmware Rev”	= Displays the firmware version of the Ethernet controller. Example: “E121003V1”
“Elapsed Time”	= Shows the time elapsed in hours since first-time power on. Example: “180”
“Current Temperature”	= Shows the internal temperature measured by onchip sensor. Example: “+027.0 C”, in Celcius Degrees.

|---2---

Service - Fault Status

Will show detected Fault Staus by measuring various internal values for “DVI Chip”, “NVRAM”, “GDC” and “TMP Sensor” during operation. Status is stated as either “OK” or “FAULT”. The contents of this submenu is listed below.

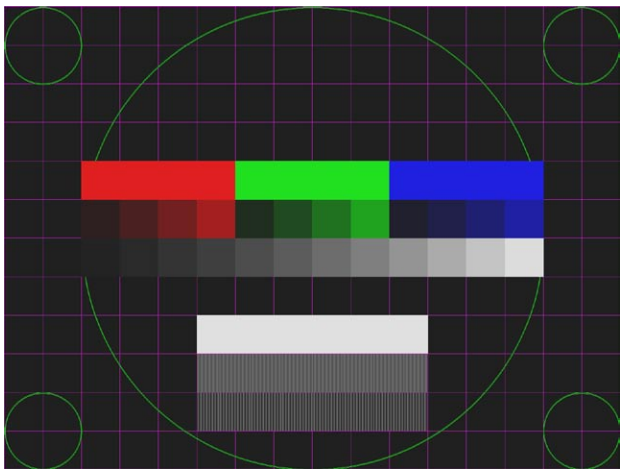
Fault Status as follows:

“DVI Chip”	= Status for on-board Digital Visual Interface graphics chip processor.
“NVRAM”	= Status for Non-volatile random-access memory, used to store parameters and settings.
“Ethernet”	= Status for Ethernet/LAN communication chip controller.
“GDC”	= Status for Glass Display Control™ (GDC) touch button controller.
“TMP Sensor”	= Status for internal temperature measured by on-chip sensor.

|---2--- Service - Test Pattern

Will show the internal 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 useful during trouble-shooting situations to determine the source of a display or connectivity problem regarding external equipment.

To active this function, touch the “MENU” button.



- Note: This function will not inform/report any deviations directly, you need to have the required technical expertise to interpret the test pattern displayed.

|---2--- Service - Burn In

Sets the unit into “Burn In” mode and enables to write EDID data. More information to follow.

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Operation Advanced (DDC/CI)

Operation Advanced (DDC/CI) Control Overview

Introduction

DDC/CI (Display Data Channel/Command Interface) specifies a means for a computer to send commands to the unit's Display Video Controller to programatically adjust parameters of the display instead of pressing physical buttons or navigate through an OSD menu. Specific commands to control units are defined in a separate official Monitor Control Command Set (MCCS) industry standard. The signal inputs supported are VGA and DVI.

Hatteland Display's Series X (Generation 1) - Maritime Multi Displays (MMD) from 12 to 26 inch will support some of these commands (units with GEV Firmware 160914) and is gradually implemented in production from 13th of February 2017 and fully implemented for units delivered after 31st of March 2017.
Reference: http://www.hatteland-display.com/mails/02_2017_ecn.html

To determine if your unit has the DDC/CI commands supported as described in this chapter, please review the "On Screen Display (OSD) Menu" chapter (Service section) in this manual.

It is expected that the user have previous experience of the DDC/CI protocol and how to implement the commands in their own control applications. A suitable starting point for sending commands, are the GUI operated (or command line version) of softMCCS software, reference: http://www.entechtaiwan.com/lib/softmccs.shtm

The listed DDC/CI commands below are equivalent to the same functions available in the well implemented Hatteland Display Serial/Ethernet Communication Control Interface (SCOM) protocol, where specified, reference: "http://www.hatteland-display.com/pdf/manual/inb100018-4_technical_manual_serial_and_ethernet_communication_control_interface(scom)_seriesx.pdf"

The column "SCOM" is a reference and not part of the DDC/CI commands explained in the table below.

Syntax: [S] = Start Condition & [P] = Stop Condition (marked with gray color). Numbers in black/green/red colors are Byte Value in Hexadecimal.

Description	Syntax and Functionality	Details and Values	SCOM Equivalent
User Brightness Control (backlight) (0x10)	Set/Write Brightness value: [S] <6E:w> 51 84 03 10 00 xx FD [P] Reply of successfull request: [S] <6F:r> FD 80 BE*[P] Read Brightness value: [S] <6E:w> 51 82 01 10 AC [P] Reply of successfull request: [S] <6F:r> 6E 88 02 00 10 00 00 64 00 xx 95*[P]	10 = Command ID Where **xx** = 0 to 64 **Min-Max Range:** 0-100 (0x00-0x64) During Read reply, these values will be present. Read/Write support.	BRT
Glass Display Control™ (GDC) Brilliance Button (0xE2)	Set/Write Brilliance Value: [S] <6E:w> 51 84 03 E2 00 xx 68 [P] Reply of successfull request: [S] <6F:r> 68 80 BE*[P] Read Brilliance Value: [S] <6E:w> 51 82 01 E2 5E [P] Reply of successfull request: [S] <6F:r> 6E 88 02 00 E2 00 00 64 00 xx 00*[P]	E2 = Command ID Where **xx** = 0 to 64 **Min-Max Range:** 0-100 (0x00-0x64) During Read reply, these values will be present. Read/Write support.	BRU
Buzzer Control (0xE5)	Write/Turn ON: [S] <6E:w> 51 84 03 E5 00 01 5C [P] Reply of successfull request: [S] <6F:r> 5C 80 BE*[P] Write/Turn OFF: [S] <6E:w> 51 84 03 E5 00 00 5D [P] Reply of successfull Turn OFF request: [S] <6F:r> 5D 80 BE*[P]	E5 = Command ID Where **01** = Turn On Where **00** = Turn Off Write Support only.	BZZ

Operation Advanced (DDC/CI) Control Overview

Color Mode: Kelvin Color Tempearture (0x14)	Set/Write Color Temperature: [S] <6E:w> 51 84 03 14 00 ww xx [P] Reply of successfull request: [S] <6F:r> xx 80 BE*[P] Read Color Temperature Value: [S] <6E:w> 51 82 01 14 A8 [P] Reply of successfull request: [S] <6F:r> 6E 88 02 00 14 00 00 0E 00 yy zz*[P]	14 = Command ID Where Write **ww xx** **05 A9** = 6500 **07 AB** = 8000 **08 A4** = 9300 Where Read **yy zz** **05 AB** = 6500 **07 A9** = 8000 **08 A6** = 9300 Read/Write support.	MCC: (Color Temperature Select)
Gamma Calibration (0x14)	Set/Write Calibration: [S] <6E:w> 51 84 03 14 00 ww xx [P] Reply of successfull request: [S] <6F:r> xx 80 BE*[P] Read Calibration: [S] <6E:w> 51 82 01 14 A8 [P] Reply of successfull request: [S] <6F:r> 6E 88 02 00 14 00 00 0E 00 yy zz*[P]	14 = Command ID Where Write **ww xx** **0C A0** = VGA **0D A1** = DVI Where Read **yy zz** **0C A2** = VGA **0D A3** = DVI Read/Write support.	MCC: (Gamma (Calibration))

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Specifications

Specifications - HD 12T21 MMD-xxx-Fxxx

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT with LED Backlight Technology
- 12.1 inch viewable image size, Aspect Ratio 4:3
- TFT active-matrix liquid crystal panel

TFT Characteristics:

• Native Resolution	: 1024 x 768
• Pixel Pitch (RGB)	: 0.24 (H) x 0.24 (V) mm
• Response Time Standard	: 35ms (typical), black to white
• Response Time High Bright	: 19ms (typical), black to white
• Contrast Ratio Standard	: 700:1 (typical)
• Contrast Ratio High Bright	: 600:1 (typical)
• Light Intensity Standard	: 600 cd/m² (typical)
• Light Intensity High Bright	: 1000 cd/m² (typical)
• Viewable Angle Standard	: +/- 80 deg. (L/R), +/- 70 deg. (U/D) (typ)
• Viewable Angle High Bright	: +/- 80 deg. (D/L/R), +/- 60 deg. (U) (typ)
• Active Display Area	: 245.76 (H) x 184.32 (V) mm
• Max Colors	: 16.7 million

Synchronization:

- Digital separate synchronization
- Composite synchronization
- Synchronization on green
- Auto detects VGA -> XGA, interlaced and non interlaced
- Video Signal : Analog RGB 0,7Vp-p
  : Input Impedance 75 Ohm

Synchronization Range:

- Horizontal : 31.5 kHz to 91.1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimal 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*

** Recommended for optimal picture quality*

Video Signals:

- Interlaced HDTV, NTSC, PAL and SECAM video
- Composite video

Power Specifications:

Power Supply options:

- 115&230VAC - 50/60Hz : HD 12T21 MMD-Cxx-Fxxx model
- 12-24 VDC (14VDC nominal): HD 12T21 MMD-Fxx-Fxxx model

Power Consumption:

- Operating Standard : 21W (typ) - 60W (max)
- Operating High Bright : 29W (typ) - 60W (max)

Physical Considerations:

- W:314.00 [12.36"] x H:272.00 [10.71"] x D:64.50 [2.54"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 4.0kg / 8.8lbs
- High Bright only: Includes an EPDM sealing gasket (IP66 console mount).

Signal Terminals:

• DVI-D Signal IN	: 2 x 24p DVI (female)
• RGB Signal IN	: 2 x 15p HD D-SUB (female)
• Comp. Video IN	: 3 x BNC connector (female)
• SCOM RS-422/485	: 1 x 5-pin Terminal Block 3.81, non-isolated+Buzzer
• RGB Signal OUT	: 1 x 15p HD D-SUB (female) - Clone of RGB IN*
• If Touchscreen	: 1 x USB TYPE A Connector (female)
• Ethernet	: 1 x RJ45 Connector for Remote Control
• SCOM RS-232	: 1 x 9p D-SUB (female) non-isolated+Buzzer
• Potmeter	: 1 x 9p D-SUB (male) (Potentiometer IN, +5VDC OUT, BRT +/- IN)
• If AC Power IN	: 1 x Std IEC Inlet
• If DC Power IN	: 1 x 2-pin Terminal Block 5.08

*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.

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, On Screen Display Menu, Brightness Control (-/+)
- Hotkeys (left/right), Mode/Status Indicator (Service)
- Buzzer (not visible), Light Sensor (not visible)

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	: Protection: IP66 front - IP22 rear (EN60529)

Lifetime 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:

• HD CMB SX1-A2	: 1 x Console Mount Kit (1-12.75mm). EN60945 Tested
• HD CMB SX1-A3	: 1 x Console Mount Kit (1-12.75mm). EN60945 Tested Long screws for easier installation in tight spaces.
• HD TMB SX1-A1	: 1 x Table Mount Bracket. EN60945 Tested
• HD VED SX1-A1	: 1 x VESA Bracket, not EN60945 Tested
• HD REM SX1-A1	: 1 x External Remote Control, EN60945 Tested

Please see user manual/datasheet for more information

Factory Options:

- Projected Capacitive Touch Screen (Multitouch, USB interface)
- Optical Bonding Technology
- Sunlight Readable / High Bright (includes Optical Bonding) -FHxx model
- Single 12-24VDC Power Input

Compass Safe Distance: HD 12T21 MMD-xxx-Fxxx Standard: 125cm Steering: 75cm

APPROVALS & CERTIFICATES

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

IEC 60945 4th (EN 60945:2002)
GL - Germanischer Lloyd
CCS - China Classification Society
EU RO MR - Mutual Recognition
IACS E10
DNV - Det Norske Veritas
BV - Bureau Veritas
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
LRS - Lloyd's Register of Shipping

Specifications - HD 15T21 MMD-xxx-Fxxx

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT with LED Backlight
- 15.0 inch viewable image size, Aspect Ratio 4:3
- TFT active-matrix liquid crystal panel

TFT Characteristics:

• Native Resolution	: 1024 x 768
• Pixel Pitch (RGB)	: 0.297 (H) x 0.297 (V) mm
• Response Time Standard	: 8ms (typical), black to white
• Response Time High Bright	: 19ms (typical), black to white
• Contrast Ratio Standard	: 1500:1 (typical)
• Contrast Ratio High Bright	: 800:1 (typical)
• Light Intensity Standard	: 400 cd/m² (typical)
• Light Intensity High Bright	: 800 cd/m² (typical)
• Viewable Angle Standard	: +/- 85 deg. (Up/Down/Left/Right) (typical)
• Viewable Angle High Bright	: +/- 80 deg. (D/L/R), +/- 60 deg. (U) (typ)
• Active Display Area	: 304.1 (H) x 228.1 (V) mm
• Max Colors	: 16.7 million

Synchronization:

- Digital separate synchronization
- Composite synchronization
- Synchronization on green
- Auto detects VGA -> XGA, interlaced and non interlaced
- Video Signal : Analog RGB 0,7Vp-p
  : Input Impedance 75 Ohm

Synchronization Range:

- Horizontal : 31.5 kHz to 91.1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimal 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*

** Recommended for optimal picture quality*

Video Signals:

- Interlaced HDTV, NTSC, PAL and SECAM video
- Composite video

Power Specifications:

Multi-power Supply:

- 115&230VAC - 50/60Hz + 24 VDC - HD 15T21 MMD-Mxx-Fxxx

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

- Operating Standard : 22W (typ) - 60W (max)
- Operating High Bright : 34W (typ) - 60W (max)

Physical Considerations:

- W:356.00 [14.02"] x H:307.00 [12.09"] x D:71.50 [2.81"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 5.4kg / 11.9lbs
- High Bright only: Includes an EPDM sealing gasket (IP66 console mount).

Signal Terminals:

• DVI-D Signal IN	: 2 x 24p DVI (female)
• RGB Signal IN	: 2 x 15p HD D-SUB (female)
• Comp. Video IN	: 3 x BNC connector (female)
• SCOM RS-422/485	: 1 x 5-pin Terminal Block 3.81, non-isolated+Buzzer
• RGB Signal OUT	: 1 x 15p HD D-SUB (female) - Clone of RGB IN*
• If Touchscreen	: 1 x USB TYPE A Connector (female)
• Ethernet	: 1 x RJ45 Connector for Remote Control
• SCOM RS-232	: 1 x 9p D-SUB (female) non-isolated+Buzzer
• Potmeter	: 1 x 9p D-SUB (male) (Potentiometer IN, +5VDC OUT, BRT +/- IN)
• AC Power IN	: 1 x Std IEC Inlet
• DC Power IN	: 1 x 2-pin Terminal Block 5.08

*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.

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, On Screen Display Menu, Brightness Control (-/+)
- Hotkeys (left/right), Mode Status Indicator (Service)
- Light Sensor (not visible), Buzzer (not visible)

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	: Protection: IP66 front - IP22 rear (EN60529)

Lifetime 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:

• HD CMB SX1-A2	: 1 x Console Mount Kit (1-12.75mm). EN60945 Tested
• HD CMB SX1-A3	: 1 x Console Mount Kit (1-12.75mm). EN60945 Tested Long screws for easier installation in tight spaces.
• HD TMB SX1-A1	: 1 x Table Mount Bracket. EN60945 Tested
• HD VED SX1-A1	: 1 x VESA Bracket, not EN60945 Tested
• JH 15TAP STD-C1	: 1 x Frame Adapter (15" Series 1 to Series X) retrofit
• HD REM SX1-A1	: 1 x External Remote Control, EN60945 Tested
• HD 15COV SX1-A1	: 1 x UV Sun Cover

Please see user manual/datasheet for more information

Factory Options:

- Projected Capacitive Touch Screen (Multitouch, USB interface)
- Optical Bonding Technology
- Sunlight Readable / High Bright (includes Optical Bonding) model

Compass Safe Distance: HD 15T21 MMD-xxx-Fxxx Standard: 125cm Steering: 75cm

APPROVALS & CERTIFICATES

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

IEC 60945 4th (EN 60945:2002)
GL - Germanischer Lloyd
CCS - China Classification Society
EU RO MR - Mutual Recognition

IACS E10
DNV - Det Norske Veritas
BV - Bureau Veritas

ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
LRS - Lloyd's Register of Shipping

Specifications - HD 17T21 MMD-xxx-Fxxx

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT with LED Backlight
- 17.0 inch viewable image size, Aspect Ratio 5:4
- TFT active-matrix liquid crystal panel

TFT Characteristics:

- Native Resolution : 1280 x 1024
- Pixel Pitch (RGB) : 0.264 (H) x 0.264 (V) mm
- Response Time : 5ms (typical), "black" to "white"
- Contrast Ratio : 1000:1 (typical)
- Light Intensity : 350 cd/m² (typical)
- Viewable Angle : +/- 80 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 337.92 (H) x 270.336 (V) mm
- Max Colors : 16.7 million

Synchronization:

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

Synchronization Range:

- Horizontal : 31.5 kHz to 91.1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimal 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 optimal picture quality*

Video Signals:

- Interlaced HDTV, NTSC, PAL and SECAM video
- Composite video

Power Specifications:

Multi-power Supply:

- 115&230VAC - 50/60Hz + 24 VDC - HD 17T21 MMD-Mxx-Fxxx

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

- Operating Standard : 32W (typ) - 60W (max)

Physical Considerations:

- W:390.00 [15.35"] x H:351.00 [13.82"] x D:73.50 [2.89"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 6.2kg / 13.6lbs

Signal Terminals:

- DVI-D Signal IN : 2 x 24p DVI (female)
- RGB Signal IN : 2 x 15p HD D-SUB (female)
- Comp. Video IN : 3 x BNC Connector (female)
- SCOM RS-422/485 : 1 x 5-pin Terminal Block 3.81, non-isolated+Buzzer
- RGB Signal OUT : 1 x 15p HD D-SUB (female) - Clone of RGB IN*
- If Touchscreen : 1 x USB TYPE A Connector (female)
- Ethernet : 1 x RJ45 Connector for Remote Control
- SCOM RS-232 : 1 x 9p D-SUB (female) non-isolated+Buzzer
- Potmeter : 1 x 9p D-SUB (male)
  (Potentiometer IN, +5VDC OUT, BRT +/- IN)
- AC Power IN : 1 x Std IEC Inlet
- DC Power IN : 1 x 2-pin Terminal Block 5.08

*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.

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, On Screen Display Menu, Brightness Control (-/+)
- Hotkeys (left/right), Mode Status Indicators (ECDIS, Service)
- Buzzer (not visible), Light Sensor (not visible)

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 : Protection: IP66 front - IP22 rear (EN60529)

Lifetime 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:

- HD CMB SX1-A2 : 1 x Console Mount Kit (1-12.75mm). EN60945 Tested
- HD CMB SX1-A3 : 1 x Console Mount Kit (1-12.75mm). EN60945 Tested
  Long screws for easier installation in tight spaces.
- HD TMB SX1-B1 : 1 x Table Mount Bracket. EN60945 Tested
- HD VED SX1-A1 : 1 x VESA Bracket, not EN60945 Tested
- HD REM SX1-A1 : 1 x External Remote Control, EN60945 Tested
- HD 17COV SX1-A1 : 1 x UV Sun Cover

Please see user manual/datasheet for more information

Factory Options:

- Projected Capacitive Touch Screen (Multitouch, USB interface)
- Optical Bonding Technology
- Sunlight Readable / High Bright (includes Optical Bonding) -FHxx model
- Color Calibrated models (ECDIS)

Compass Safe Distance: HD 17T21 MMD-xxx-Fxxx Standard: 125cm Steering: 75cm

APPROVALS & CERTIFICATES

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

IEC 60945 4th (EN 60945:2002)
GL - Germanischer Lloyd
CCS - China Classification Society
EU RO MR - Mutual Recognition
IACS E10
DNV - Det Norske Veritas
BV - Bureau Veritas
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
LRS - Lloyd's Register of Shipping

Specifications - HD 17T21 MMD-xxx-FHxx

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT with LED Backlight Technology
- Sunlight Readable / High Bright (includes Optical Bonding Technology)
- 17.0 inch viewable image size, Aspect Ratio 5:4
- TFT active-matrix liquid crystal panel

TFT Characteristics:

- Native Resolution : 1280 x 1024
- Pixel Pitch (RGB) : 0.264 (H) x 0.264 (V) mm
- Response Time : 5ms (typical), "black" to "white"
- Contrast Ratio : 1000:1 (typical)
- Light Intensity : 1000 cd/m² (typical)
- Viewable Angle : +/- 80 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 337.92 (H) x 270.336 (V) mm
- Max Colors : 16.7 million

Synchronization:

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

Synchronization Range:

- Horizontal : 31.5 kHz to 91.1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimal 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 optimal picture quality*

Video Signals:

- Interlaced HDTV, NTSC, PAL and SECAM video
- Composite video

Power Specifications:

Multi-power Supply:

- 115&230VAC - 50/60Hz + 24 VDC - HD 17T21 MMD-Mxx-FHxx

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

- Operating : 59W (typ) - 120W (max)

Physical Considerations:

- W:390.00 [15.35"] x H:351.00 [13.82"] x D:80.50 [3.17"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 6.2kg / 13.6lbs
- Delivery includes an EPDM sealing gasket for IP66 console mount.

Signal Terminals:

- DVI-D Signal IN : 2 x 24p DVI (female)
- RGB Signal IN : 2 x 15p HD D-SUB (female)
- Comp. Video IN : 3 x BNC Connector (female)
- SCOM RS-422/485 : 1 x 5-pin Terminal Block 3.81, non-isolated+Buzzer
- RGB Signal OUT : 1 x 15p HD D-SUB (female) - Clone of RGB IN*
- If Touchscreen : 1 x USB TYPE A Connector (female)
- Ethernet : 1 x RJ45 Connector for Remote Control
- SCOM RS-232 : 1 x 9p D-SUB (female) non-isolated+Buzzer
- Potmeter : 1 x 9p D-SUB (male)
  (Potentiometer IN, +5VDC OUT, BRT +/- IN)
- AC Power IN : 1 x Std IEC Inlet
- DC Power IN : 1 x 2-pin Terminal Block 5.08

*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.

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, On Screen Display Menu, Brightness Control (-/+)
- Hotkeys (left/right), Mode Status Indicators (ECDIS, Service)
- Buzzer (not visible), Light Sensor (not visible)

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 : Protection: IP66 front - IP22 rear (EN60529)

Lifetime 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:

- HD CMB SX1-A2 : 1 x Console Mount Kit (1-12.75mm). EN60945 Tested
- HD CMB SX1-A3 : 1 x Console Mount Kit (1-12.75mm). EN60945 Tested
  Long screws for easier installation in tight spaces.
- HD TMB SX1-B1 : 1 x Table Mount Bracket. EN60945 Tested
- HD VED SX1-A1 : 1 x VESA Bracket, not EN60945 Tested
- HD REM SX1-A1 : 1 x External Remote Control, EN60945 Tested
- HD 17COV SX1-A1 : 1 x UV Sun Cover

Please see user manual/datasheet for more information

Factory Options:

- Projected Capacitive Touch Screen (Multitouch, USB interface)
- Color Calibrated models (ECDIS)

Compass Safe Distance: HD 17T21 MMD-xxx-FHxx Standard: 125cm Steering: 75cm

APPROVALS & CERTIFICATES

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

IEC 60945 4th (EN 60945:2002)
GL - Germanischer Lloyd
CCS - China Classification Society
EU RO MR - Mutual Recognition
IACS E10
DNV - Det Norske Veritas
BV - Bureau Veritas
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
LRS - Lloyd's Register of Shipping

Specifications - HD 19T21 MMD-xxx-Fxxx

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT with LED Backlight
- 19.0 inch viewable image size, Aspect Ratio 5:4
- TFT active-matrix liquid crystal panel
- MVA (Multi-domain Vertical Alignment) LCD Technology

TFT Characteristics:

• Native Resolution	: 1280 x 1024
• Pixel Pitch (RGB)	: 0.294 (H) x 0.294 (V) mm
• Response Time	: 20ms (typical), "black" to "white"
• Contrast Ratio	: 1500:1 (typical)
• Light Intensity	: 350 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 million

Synchronization:

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

Synchronization Range:

- Horizontal : 31.5 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*

Video Signals:

- Interlaced HDTV, NTSC, PAL and SECAM video
- Composite video

Power Specifications:

Multi-power Supply:

- 115&230VAC - 50/60Hz + 24 VDC - HD 19T21 MMD-Mxx-Fxxx

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

- Operating Standard : 42W (typ) - 125W (max)

Physical Considerations:

- W:429.00 [16.89"] x H:382.00 [15.04"] x D:74.50 [2.93"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 8.2kg / 18.0lbs

Signal Terminals:

• DVI-D Signal IN	: 2 x 24p DVI (female)
• RGB Signal IN	: 2 x 15p HD D-SUB (female)
• Comp. Video IN	: 3 x BNC Connector (female)
• SCOM RS-422/485	: 1 x 5-pin Terminal Block 3.81, non-isolated+Buzzer
• RGB Signal OUT	: 1 x 15p HD D-SUB (female) - Clone of RGB IN*
• If Touchscreen	: 1 x USB TYPE A Connector. (female)
• Ethernet	: 1 x RJ45 Connector for Remote Control
• SCOM RS-232	: 1 x 9p D-SUB (female) non-isolated+Buzzer
• Potmeter	: 1 x 9p D-SUB (male) (Potentiometer IN, +5VDC OUT, BRT +/- IN)
• AC Power IN	: 1 x Std IEC Inlet
• DC Power IN	: 1 x 2-pin Terminal Block 5.08

*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.

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, On Screen Display Menu, Brightness Control (-/+)
- Hotkeys (left/right), Mode Status Indicators (ECDIS, Service)
- Buzzer (not visible), Light Sensor (not visible)

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	: Protection: IP66 front - IP22 rear (EN60529)

Lifetime 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:

• HD CMB SX1-A2	: 1 x Console Mount Kit (1-12.75mm). EN60945 Tested
• HD CMB SX1-A3	: 1 x Console Mount Kit (1-12.75mm). EN60945 Tested Long screws for easier installation in tight spaces.
• HD TMB SX1-B1	: 1 x Table Mount Bracket. EN60945 Tested
• HD VED SX1-A1	: 1 x VESA Bracket, not EN60945 Tested
• JH 19TAP STD-C1	: 1 x Frame Adapter (19" Series 1 to Series X) retrofit
• HD 19TAP SX1-C2	: 1 x Frame Adapter (19" Series X to Series 2) retrofit
• HD REM SX1-A1	: 1 x External Remote Control, EN60945 Tested
• HD 19COV SX1-A1	: 1 x UV Sun Cover

Please see user manual/datasheet for more information

Factory Options:

- Projected Capacitive Touch Screen (Multitouch, USB interface)
- Optical Bonding Technology
- Sunlight Readable / High Bright (includes Optical Bonding) -FHxx model
- Color Calibrated models (ECDIS)

Compass Safe Distance: HD 19T21 MMD-xxx-Fxxx Standard: 125cm Steering: 75cm

APPROVALS & CERTIFICATES

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

IEC 60945 4th (EN 60945:2002)
GL - Germanischer Lloyd
CCS - China Classification Society
EU RO MR - Mutual Recognition
IACS E10
DNV - Det Norske Veritas
BV - Bureau Veritas
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
LRS - Lloyd's Register of Shipping

Specifications - HD 19T21 MMD-xxx-FHxx

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT with LED Backlight Technology
- Sunlight Readable / High Bright (includes Optical Bonding Technology)
- 19.0 inch viewable image size, Aspect Ratio 5:4
- TFT active-matrix liquid crystal panel
- MVA (Multi-domain Vertical Alignment) LCD Technology

TFT Characteristics:

- Native Resolution : 1280 x 1024
- Pixel Pitch (RGB) : 0.294 (H) x 0.294 (V) mm
- Response Time : 20ms (typical), "black" to "white"
- Contrast Ratio : 1000:1 (typical)
- Light Intensity : 1000 cd/m² (typical)
- Viewable Angle : +/- 89 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 376.32 (H) x 301.056 (V) mm
- Max Colors : 16.7 million

Synchronization:

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

Synchronization Range:

- Horizontal : 31.5 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*

Video Signals:

- Interlaced HDTV, NTSC, PAL and SECAM video
- Composite video

Power Specifications:

Multi-power Supply:

- 115&230VAC - 50/60Hz + 24 VDC - HD 19T21 MMD-Mxx-FHxx

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

- Operating : 72W (typ) - 125W (max)

Physical Considerations:

- W:429.00 [16.89"] x H:382.00 [15.04"] x D:81.50 [3.21"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 8.2kg / 18.0lbs
- Delivery includes an EPDM sealing gasket for IP66 console mount.

Signal Terminals:

- DVI-D Signal IN : 2 x 24p DVI (female)
- RGB Signal IN : 2 x 15p HD D-SUB (female)
- Comp. Video IN : 3 x BNC Connector (female)
- SCOM RS-422/485 : 1 x 5-pin Terminal Block 3.81, non-isolated+Buzzer
- RGB Signal OUT : 1 x 15p HD D-SUB (female) - Clone of RGB IN*
- If Touchscreen : 1 x USB TYPE A Connector. (female)
- Ethernet : 1 x RJ45 Connector for Remote Control
- SCOM RS-232 : 1 x 9p D-SUB (female) non-isolated+Buzzer
- Potmeter : 1 x 9p D-SUB (male)
  (Potentiometer IN, +5VDC OUT, BRT +/- IN)
- AC Power IN : 1 x Std IEC Inlet
- DC Power IN : 1 x 2-pin Terminal Block 5.08

*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.

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, On Screen Display Menu, Brightness Control (-/+)
- Hotkeys (left/right), Mode Status Indicators (ECDIS, Service)
- Buzzer (not visible), Light Sensor (not visible)

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 : Protection: IP66 front - IP22 rear (EN60529)

Lifetime 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:

- HD CMB SX1-A2 : 1 x Console Mount Kit (1-12.75mm). EN60945 Tested
- HD CMB SX1-A3 : 1 x Console Mount Kit (1-12.75mm). EN60945 Tested
  Long screws for easier installation in tight spaces.
- HD TMB SX1-B1 : 1 x Table Mount Bracket. EN60945 Tested
- HD VED SX1-A1 : 1 x VESA Bracket, not EN60945 Tested
- JH 19TAP STD-C1 : 1 x Frame Adapter (19" Series 1 to Series X) retrofit
- HD 19TAP SX1-C2 : 1 x Frame Adapter (19" Series X to Series 2) retrofit
- HD REM SX1-A1 : 1 x External Remote Control, EN60945 Tested
- HD 19COV SX1-A1 : 1 x UV Sun Cover

Please see user manual/datasheet for more information

Factory Options:

- Projected Capacitive Touch Screen (Multitouch, USB interface)
- Color Calibrated models (ECDIS)

Compass Safe Distance: HD 19T21 MMD-xxx-FHxx Standard: 125cm Steering: 75cm

APPROVALS & CERTIFICATES

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

IEC 60945 4th (EN 60945:2002)
GL - Germanischer Lloyd
CCS - China Classification Society
EU RO MR - Mutual Recognition
IACS E10
DNV - Det Norske Veritas
BV - Bureau Veritas
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
LRS - Lloyd's Register of Shipping

Specifications - HD 24T21 MMD-xxx-Fxxx

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT with LED Backlight
- 24.0 inch viewable image size, Widescreen, Aspect Ratio 16:9
- TFT active-matrix liquid crystal panel, RGB vertical stripe
- MVA (Multi-domain Vertical Alignment) LCD Technology

TFT Characteristics:

- Native Resolution : 1920 x 1080 (FHD)
- Pixel Pitch (RGB) : 0.276 (H) x 0.276 (V) mm
- Response Time : 25 ms (typical), "black" to "white"
- Contrast Ratio : 3000:1 (typical)
- Light Intensity : 300 cd/m² (typical)
- Viewable Angle : +/- 89 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 531.36 (H) x 298.89 (V) mm
- Max Colors : 16.7 million

Synchronization:

- Digital separate synchronization
- Composite synchronization
- Synchronization on green
- Auto detects VGA -> WUXGA, interlaced and non interlaced
- Video Signal : Analog RGB 0,7Vp-p
  : Input Impedance 75 Ohm

Synchronization Range:

- Horizontal : 31.5 kHz to 91.1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimal 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
- FHD : 1920 x 1080*
- WUXGA : 1920 x 1200

** Recommended for optimal picture quality*

Video Signals:

- Interlaced HDTV, NTSC, PAL and SECAM video
- Composite video

Power Specifications:

Multi-power Supply:

- 115&230VAC - 50/60Hz + 24 VDC - HD 24T21 MMD-Mxx-Fxxx

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

- Operating Standard : 49W (typ) - 125W (max)

Physical Considerations:

- W:593.00 [23.35"] x H:384.00 [15.12"] x D:70.00 [2.76"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 11.0 kg / 24.2lbs

Signal Terminals:

- DVI-D Signal IN : 2 x 24p DVI (female)
- RGB Signal IN : 2 x 15p HD D-SUB (female)
- Comp. Video IN : 3 x BNC Connector (female)
- SCOM RS-422/485 : 1 x 5-pin Terminal Block 3.81, non-isolated+Buzzer
- RGB Signal OUT : 1 x 15p HD D-SUB (female) - Clone of RGB IN*
- If Touchscreen : 1 x USB TYPE A Connector (female)
- Ethernet : 1 x RJ45 Connector for Remote Control
- SCOM RS-232 : 1 x 9p D-SUB (female) non-isolated+Buzzer
- Potmeter : 1 x 9p D-SUB (male)
  (Potentiometer IN, +5VDC OUT, BRT +/- IN)
- AC Power IN : 1 x Std IEC Inlet
- DC Power IN : 1 x 2-pin Terminal Block 5.08

*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.

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, On Screen Display Menu, Brightness Control (-/+)
- Hotkeys (left/right), Mode Status Indicators (ECDIS, Service)
- Buzzer (not visible), Light Sensor (not visible)

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 : Protection: IP66 front – IP22 rear (EN60529)

Lifetime 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:

- HD CMB SX1-B1 : 1 x Console Mount Kit. EN60945 Tested
- HD TMB SX1-C1 : 1 x Table Mount Bracket. EN60945 Tested
- HD VED SX1-A1 : 1 x VESA Bracket, not EN60945 Tested
- HD REM SX1-A1 : 1 x External Remote Control, EN60945 Tested
- HD 24COV SX1-A1 : 1 x UV Sun Cover

Please see user manual/datasheet for more information

Factory Options:

- Projected Capacitive Touch Screen (Multitouch, USB interface)
- Optical Bonding Technology
- Sunlight Readable / High Bright (includes Optical Bonding) -FHxx model
- Color Calibrated models (ECDIS)

Compass Safe Distance: HD 24T21 MMD-xxx-Fxxx Standard: 70cm Steering: 45cm

APPROVALS & CERTIFICATES

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

IEC 60945 4th (EN 60945:2002)
GL - Germanischer Lloyd
CCS - China Classification Society
EU RO MR - Mutual Recognition
IACS E10
DNV - Det Norske Veritas
BV - Bureau Veritas
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
LRS - Lloyd's Register of Shipping

Specifications - HD 24T21 MMD-xxx-FHxx

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT with LED Backlight Technology
- Sunlight Readable / High Bright (includes Optical Bonding Technology)
- 24.0 inch viewable image size, Widescreen, Aspect Ratio 16:9
- TFT active-matrix liquid crystal panel, RGB vertical stripe
- MVA (Multi-domain Vertical Alignment) LCD Technology

TFT Characteristics:

- Native Resolution : 1920 x 1080 (FHD)
- Pixel Pitch (RGB) : 0.276 (H) x 0.276 (V) mm
- Response Time : 25 ms (typical), "black" to "white"
- Contrast Ratio : 3000:1 (typical)
- Light Intensity : 1000 cd/m² (typical)
- Viewable Angle : +/- 89 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 531.36 (H) x 298.89 (V) mm
- Max Colors : 16.7 million

Synchronization:

- Digital separate synchronization
- Composite synchronization
- Synchronization on green
- Auto detects VGA -> WUXGA, interlaced and non interlaced
- Video Signal : Analog RGB 0,7Vp-p
  : Input Impedance 75 Ohm

Synchronization Range:

- Horizontal : 31.5 kHz to 91.1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimal 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
- FHD : 1920 x 1080*
- WUXGA : 1920 x 1200

** Recommended for optimal picture quality*

Video Signals:

- Interlaced HDTV, NTSC, PAL and SECAM video
- Composite video

Power Specifications:

Multi-power Supply:

- 115&230VAC - 50/60Hz + 24 VDC

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

- Operating: 70W (max)*

**Specified as delivered from factory. All additional loads for installed / connected equipment have to be added to power consumption and multiplied by 1.6 to compensate for efficiency in power converters.*

Physical Considerations:

- W:593.00 [23.35"] x H:384.00 [15.12"] x D:77.00 [3.03"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 11.0 kg / 24.2lbs
- Delivery includes an EPDM sealing gasket for IP66 console mount.

Signal Terminals:

- DVI-D Signal IN : 2 x 24p DVI (female)
- RGB Signal IN : 2 x 15p HD D-SUB (female)
- Comp. Video IN : 3 x BNC Connector (female)
- SCOM RS-422/485 : 1 x 5-pin Terminal Block 3.81, non-isolated+Buzzer
- RGB Signal OUT : 1 x 15p HD D-SUB (female) - Clone of RGB IN*
- If Touchscreen : 1 x USB TYPE A Connector (female)
- Ethernet : 1 x RJ45 Connector for Remote Control
- SCOM RS-232 : 1 x 9p D-SUB (female) non-isolated+Buzzer
- Potmeter : 1 x 9p D-SUB (male)
  (Potentiometer IN, +5VDC OUT, BRT +/- IN)
- AC Power IN : 1 x Std IEC Inlet
- DC Power IN : 1 x 2-pin Terminal Block 5.08

*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.

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, On Screen Display Menu, Brightness Control (-/+)
- Hotkeys (left/right), Mode Status Indicators (ECDIS, Service)
- Buzzer (not visible), Light Sensor (not visible)

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 : Protection: IP66 front – IP22 rear (EN60529)

Lifetime 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:

- HD CMB SX1-B1 : 1 x Console Mount Kit. EN60945 Tested
- HD TMB SX1-C1 : 1 x Table Mount Bracket. EN60945 Tested
- HD VED SX1-A1 : 1 x VESA Bracket, not EN60945 Tested
- HD REM SX1-A1 : 1 x External Remote Control, EN60945 Tested
- HD 24COV SX1-A1 : 1 x UV Sun Cover

Please see user manual/datasheet for more information

Factory Options:

- Projected Capacitive Touch Screen (Multitouch, USB interface)
- Color Calibrated models (ECDIS)

Compass Safe Distance: HD 24T21 MMD-xxx-Fxxx Standard: 70cm Steering: 45cm

APPROVALS & CERTIFICATES

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

IEC 60945 4th (EN 60945:2002)
GL - Germanischer Lloyd
CCS - China Classification Society
EU RO MR - Mutual Recognition
IACS E10
DNV - Det Norske Veritas
BV - Bureau Veritas
ClassNK - Nippon Kaiji Kyokai
ABS - American Bureau of Shipping
LRS - Lloyd's Register of Shipping

Specifications - HD 26T21 MMD-xxx-Fxxx

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT with LED Backlight Technology
- 25.54 inch viewable image size, Widescreen, Aspect Ratio 16:10
- S-MVA, Active Matrix, Thin Film Transistor (TFT)
- RGB Vertical Stripe

TFT Characteristics:

- Native Resolution : 1920 x 1200
- Pixel Pitch (RGB) : 0.2865 (H) x 0.2865 (V) mm
- Response Time : 20ms (Tr+Tf)
- Contrast Ratio : 1500:1 (typical)
- Light Intensity : 350 cd/m^2 (typical)
- Viewable Angle : +/- 88 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 550.08 (H) x 343.8 (V) mm
- Max Colors : 16.7 million

Synchronization:

- Digital separate synchronization
- Composite synchronization
- Synchronization on green
- Auto detects VGA -> WUXGA, interlaced and non interlaced
- Video Signal : Analog RGB 0,7Vp-p
  : Input Impedance 75 Ohm

Synchronization Range:

- Horizontal : 31.5 kHz to 91.1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimal 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
- FHD : 1920 x 1080
- WUXGA : 1920 x 1200*

** Recommended for optimal picture quality*

Video Signals:

- Interlaced HDTV, NTSC, PAL and SECAM video
- Composite video

Power Specifications:

Multi-power Supply:

- 115&230VAC - 50/60Hz + 24 VDC - HD 26T21 MMD-Mxx-Fxxx

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

- Operating AC/DC: 60W (typ) - 185W (max)

Physical Considerations:

- W:621.00 [24.45"] x H:435.00 [17.13"] x D:98.20 [3.86"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 15.6kg / 34.3lbs

Signal Terminals:

- DVI-D Signal IN : 2 x 24p DVI (female)
- RGB Signal IN : 2 x 15p HD D-SUB (female)
- Comp. Video IN : 3 x BNC Connector (female)
- SCOM RS-422/485 : 1 x 5-pin Terminal Block 3.81, non-isolated+Buzzer
- RGB Signal OUT : 1 x 15p HD D-SUB (female) - Clone of RGB IN*
- If Touchscreen : 1 x USB TYPE A Connector (female)
- Ethernet : 1 x RJ45 Connector for Remote Control
- SCOM RS-232 : 1 x 9p D-SUB (female) non-isolated
- Potmeter : 1 x 9p D-SUB (male)
  (Potentiometer IN, +5VDC OUT, BRT +/- IN)
- AC Power IN : 1 x Std IEC Inlet
- DC Power IN : 1 x 2-pin Terminal Block 5.08

*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.

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, On Screen Display Menu, Brightness Control (-/+)
- Hotkeys (left/right), Mode Status Indicators (ECDIS, Service)
- Buzzer (not visible), Light Sensor (not visible)

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 : Protection: IP66 front – IP22 rear (EN60529)
- Compass Safe Dist. : HD26T21MMD-xxx-Fxxx - Std: 130cm Steering: 70cm

Lifetime 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:

- HD CMB SX1-C1 : 1 x Console Mount Kit. EN60945 Tested
- HD TMB SX1-C1 : 1 x Table Mount Bracket. EN60945 Tested
- HD VED SX1-A1 : 1 x VESA Bracket, not EN60945 Tested
- HD REM SX1-A1 : 1 x External Remote Control, EN60945 Tested

Please see user manual/datasheet for more information

Factory Options:

- Projected Capacitive Touch Screen (Multitouch, USB interface)
- Optical Bonding Technology
- Color Calibrated models (ECDIS)
- Single AC Power 115&230VAC - 50/60Hz Input

APPROVALS & CERTIFICATES

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

IEC 60945 4th (EN 60945:2002)
DNV - Det Norske Veritas
LRS - Lloyd's Register of Shipping
IACS E10
ABS - American Bureau of Shipping
EU RO MR - Mutual Recognition
ClassNK - Nippon Kaiji Kyokai
CCS - China Classification Society
GL - Germanischer Lloyd
BV - Bureau Veritas

Specifications - HD 26T21 MMD-xxx-FxxC (LED/CCFL version)

All specifications are subject to change without prior notice!

TFT Technology:

- High Quality TFT with LED or CCFL Backlight Technology
- 25.54 inch viewable image size, Widescreen, Aspect Ratio 16:10
- S-MVA, Active Matrix, Thin Film Transistor (TFT)
- RGB Vertical Stripe

TFT Characteristics:

- Native Resolution : 1920 x 1200
- Pixel Pitch (RGB) : 0.2865 (H) x 0.2865 (V) mm
- Response Time (CCFL) : 8 ms (typical), "gray" to "gray"
- Response Time (LED) : 20ms (Tr+Tf)
- Contrast Ratio : 1500:1 (typical)
- Light Intensity : 350 cd/m^2 (typical)
- Viewable Angle : +/- 88 deg. (typical) (Up/Down/Left/Right)
- Active Display Area : 550.08 (H) x 343.8 (V) mm
- Max Colors : 16.7 million

Synchronization:

- Digital separate synchronization
- Composite synchronization
- Synchronization on green
- Auto detects VGA -> WUXGA, interlaced and non interlaced
- Video Signal : Analog RGB 0,7Vp-p
  : Input Impedance 75 Ohm

Synchronization Range:

- Horizontal : 31.5 kHz to 91.1 kHz
- Vertical : 60 Hz* to 85 Hz

** Recommended for optimal 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
- FHD : 1920 x 1080
- WUXGA : 1920 x 1200*

** Recommended for optimal picture quality*

Video Signals:

- Interlaced HDTV, NTSC, PAL and SECAM video
- Composite video

Power Specifications:

Multi-power Supply:

- 115&230VAC - 50/60Hz + 24 VDC - HD 26T21 MMD-Mxx-FxxC

Note: You may connect either AC power or DC power or both. In case both sources are connected, power will be sourced from the AC input. If AC input is lost, there will be a uninterrupted switch-over to DC input.

Power Consumption:

- Operating AC/DC: 107W (typ) - 125W (max)

Physical Considerations:

- W:621.40 [24.46"] x H:435.40 [17.14"] x D:105.20 [4.13"] mm [inch]
- 4 x M6 VESA mounting 280x150mm, Max 12mm deep
- Weight: 15.5kg / 34.1lbs

Signal Terminals:

- DVI-D Signal IN : 2 x 24p DVI (female)
- RGB Signal IN : 2 x 15p HD D-SUB (female)
- Comp. Video IN : 3 x BNC Connector (female)
- SCOM RS-422/485 : 1 x 5-pin Terminal Block 3.81, non-isolated+Buzzer
- RGB Signal OUT : 1 x 15p HD D-SUB (female) - Clone of RGB IN*
- Touchscreen : 1 x USB TYPE A Connector (female)
- Ethernet : 1 x RJ45 Connector for Remote Control
- SCOM RS-232 : 1 x 9p D-SUB (female) non-isolated
- Potmeter : 1 x 9p D-SUB (male)
  (Potentiometer IN, +5VDC OUT, BRT +/- IN)
- AC Power IN : 1 x Std IEC Inlet
- DC Power IN : 1 x 2-pin Terminal Block 5.08

*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.

User Controls:

Behind front bezel - Glass Display Control™ (GDC) IP66:

- Power On/Off, On Screen Display Menu, Brightness Control (-/+)
- Hotkeys (left/right), Mode Status Indicators (ECDIS, Service)
- Buzzer (not visible), Light Sensor (not visible)

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 : Protection: IP66 front – IP22 rear (EN60529)
- Compass Safe Dist. : HD26T21MMD-xxx-Fxxx - Std: 130cm Steering: 70cm

Lifetime 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:

- HD CMB SX1-C1 : 1 x Console Mount Kit. EN60945 Tested
- HD TMB SX1-C1 : 1 x Table Mount Bracket. EN60945 Tested
- HD VED SX1-C1 : 1 x VESA Bracket, not EN60945 Tested

Please see user manual/datasheet for more information

Factory Options:

- Color Calibrated models (ECDIS)
- Single AC Power 115&230VAC - 50/60Hz Input

Factory Defaults:

- Optical Bonding Technology
- Capacitive Touch Screen (USB interface)
- Cosmetic aluminum front frame

For a full overview of typenumbers, please review the following link:
www.hatteland-display.com/pdflink/ind100780-3.php

APPROVALS & CERTIFICATES

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

IEC 60945 4th (EN 60945:2002)
DNV - Det Norske Veritas
LRS - Lloyd's Register of Shipping
IACS E10
ABS - American Bureau of Shipping
EU RO MR - Mutual Recognition
ClassNK - Nippon Kaiji Kyokai
CCS - China Classification Society
GL - Germanischer Lloyd
BV - Bureau Veritas

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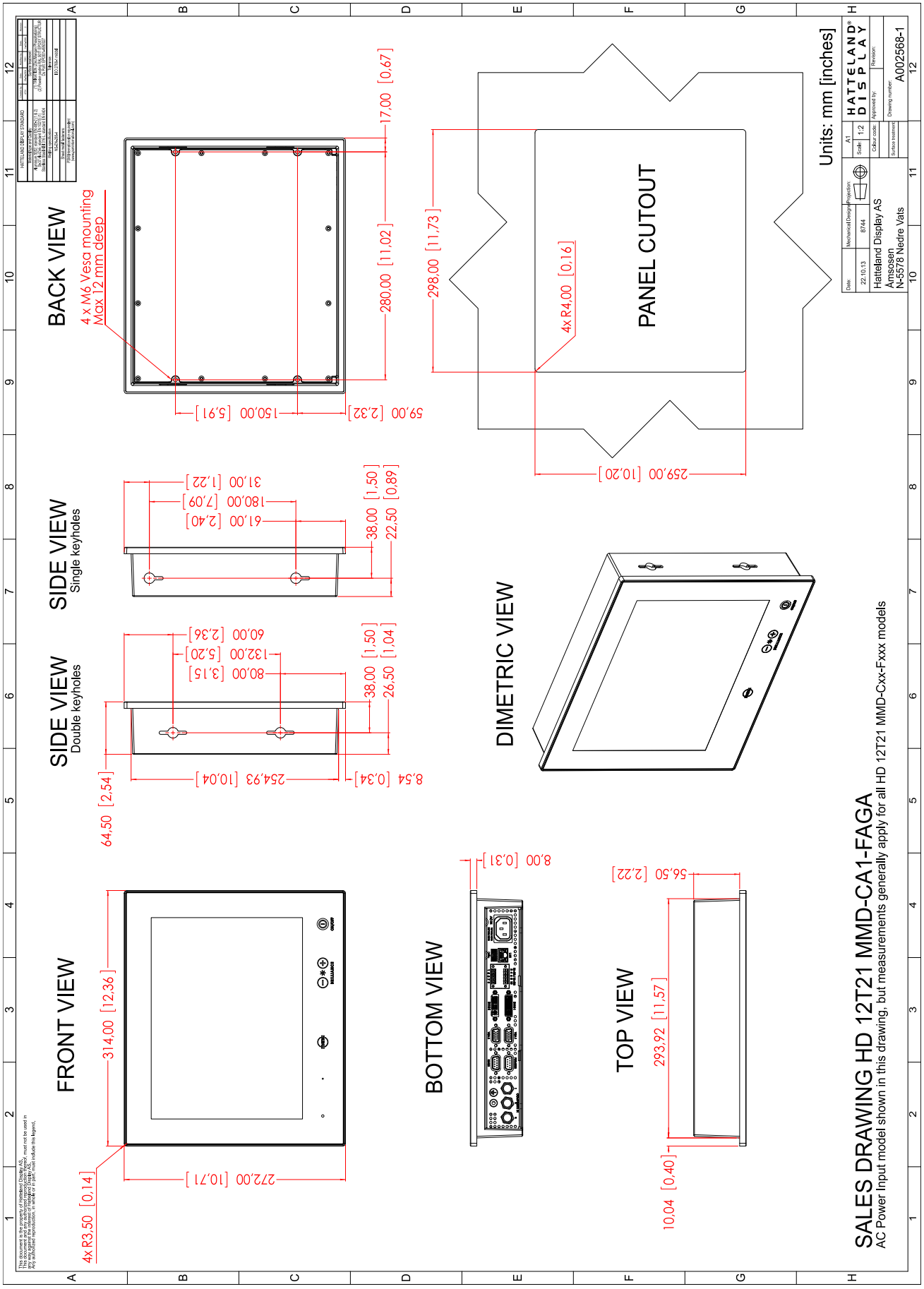
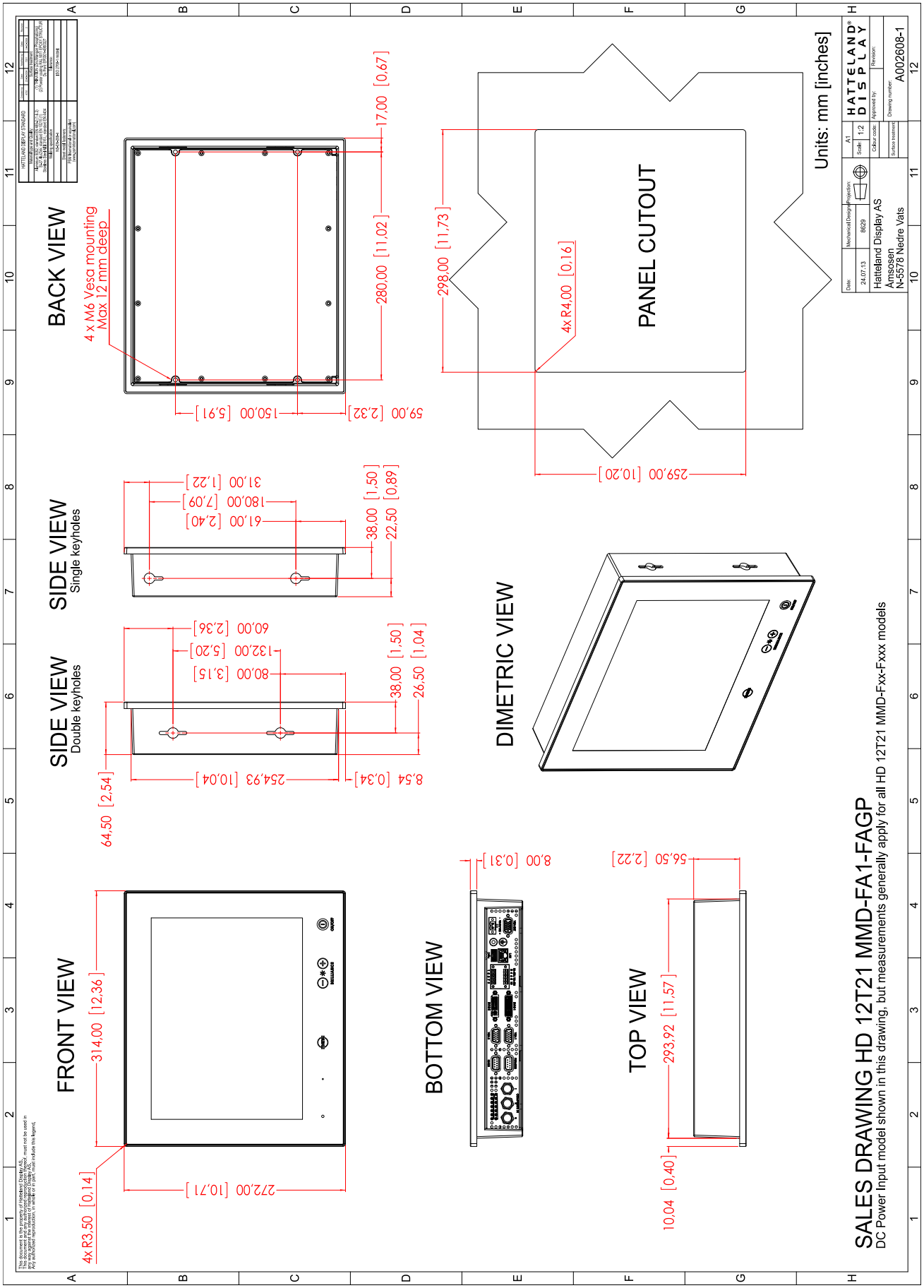
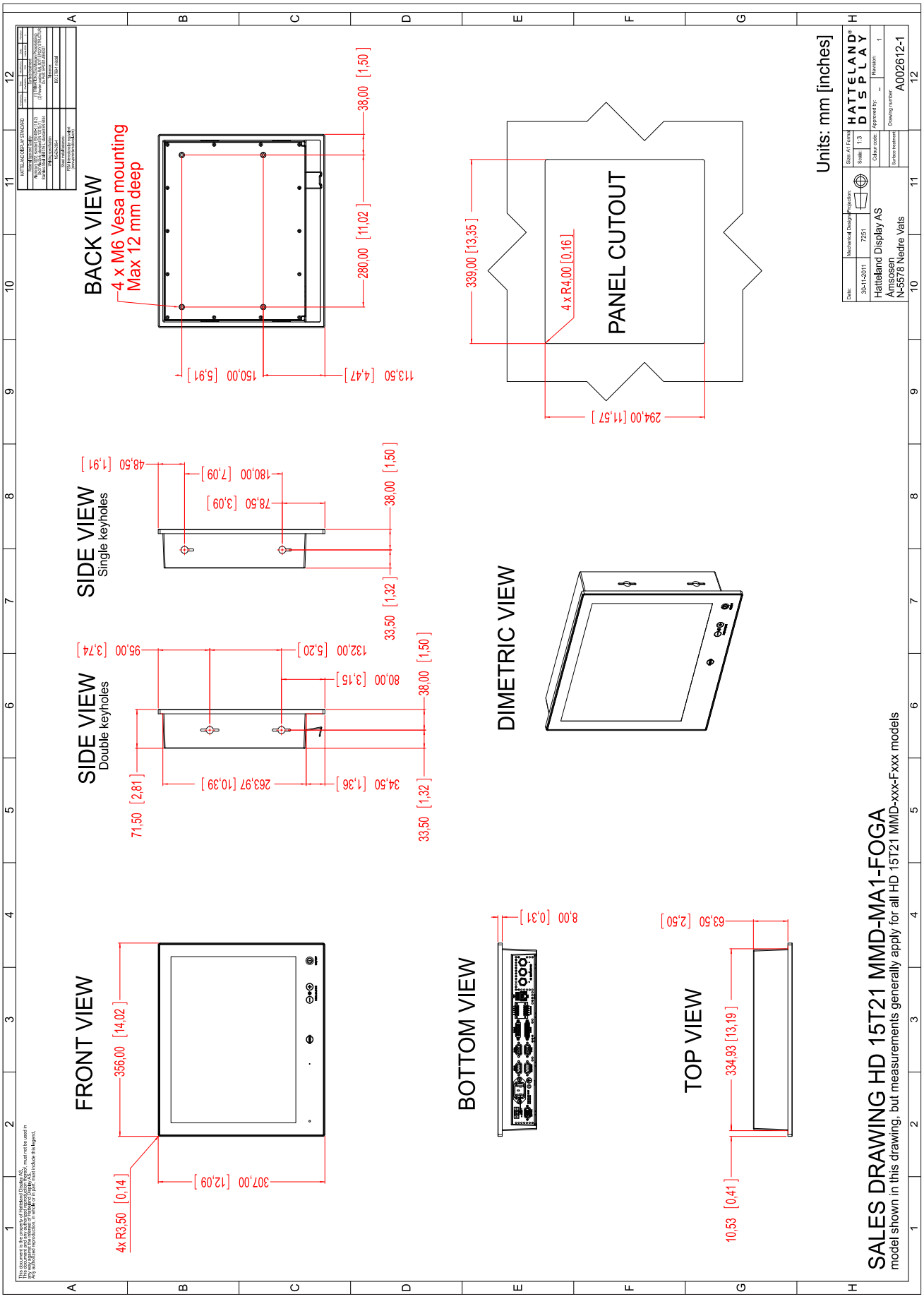
Technical Drawings

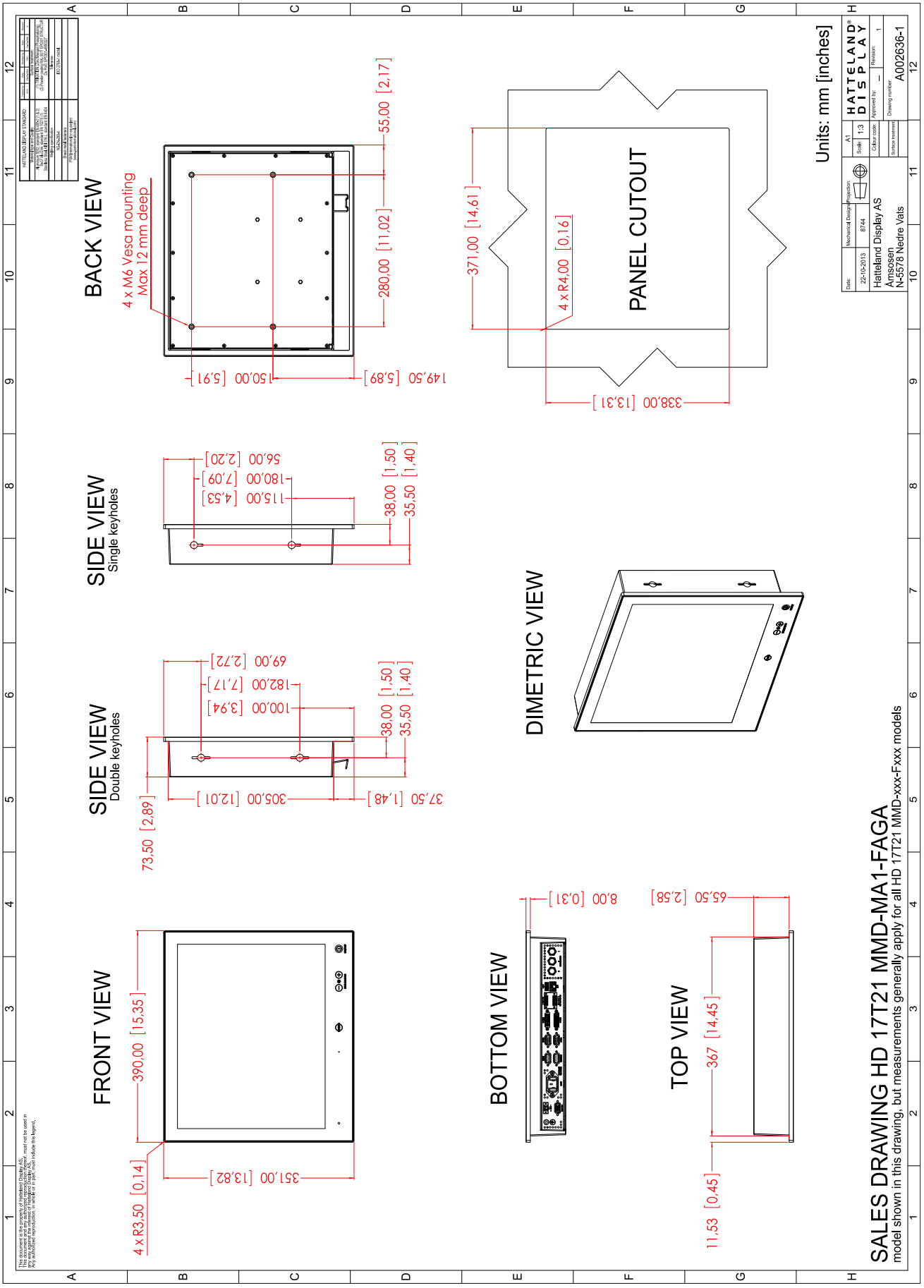


Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.


BACK VIEW
4 x M6 Vesa mounting
Max 12 mm deep
17,00 [0,67]
280,00 [11,02]
150,00 [5,91]
59,00 [2,32]
PANEL CUTOUT
298,00 [11,73]
4x R4,00 [0,16]
259,00 [10,20]
Units: mm [inches]
SIDE VIEW
Single keyholes
31,00 [1,22]
180,00 [7,09]
61,00 [2,40]
38,00 [1,50]
22,50 [0,89]
SIDE VIEW
Double keyholes
60,00 [2,36]
132,00 [5,20]
80,00 [3,15]
38,00 [1,50]
26,50 [1,04]
254,93 [10,04]
8,54 [0,34]
64,50 [2,54]
DIMETRIC VIEW
FRONT VIEW
314,00 [12,36]
272,00 [10,71]
4x R3,50 [0,14]
BOTTOM VIEW
8,00 [0,31]
TOP VIEW
56,50 [2,22]
293,92 [11,57]
10,04 [0,40]
SALES DRAWING HD 12T21 MMD-FA1-FAGP
DC Power Input model shown in this drawing, but measurements generally apply for all HD 12T21 MMD-Fxx-Fxxx models
HATTELAND DISPLAY
Hatteland Display AS
Arnsosen
N-5578 Nedre Vats
A002608-1

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.





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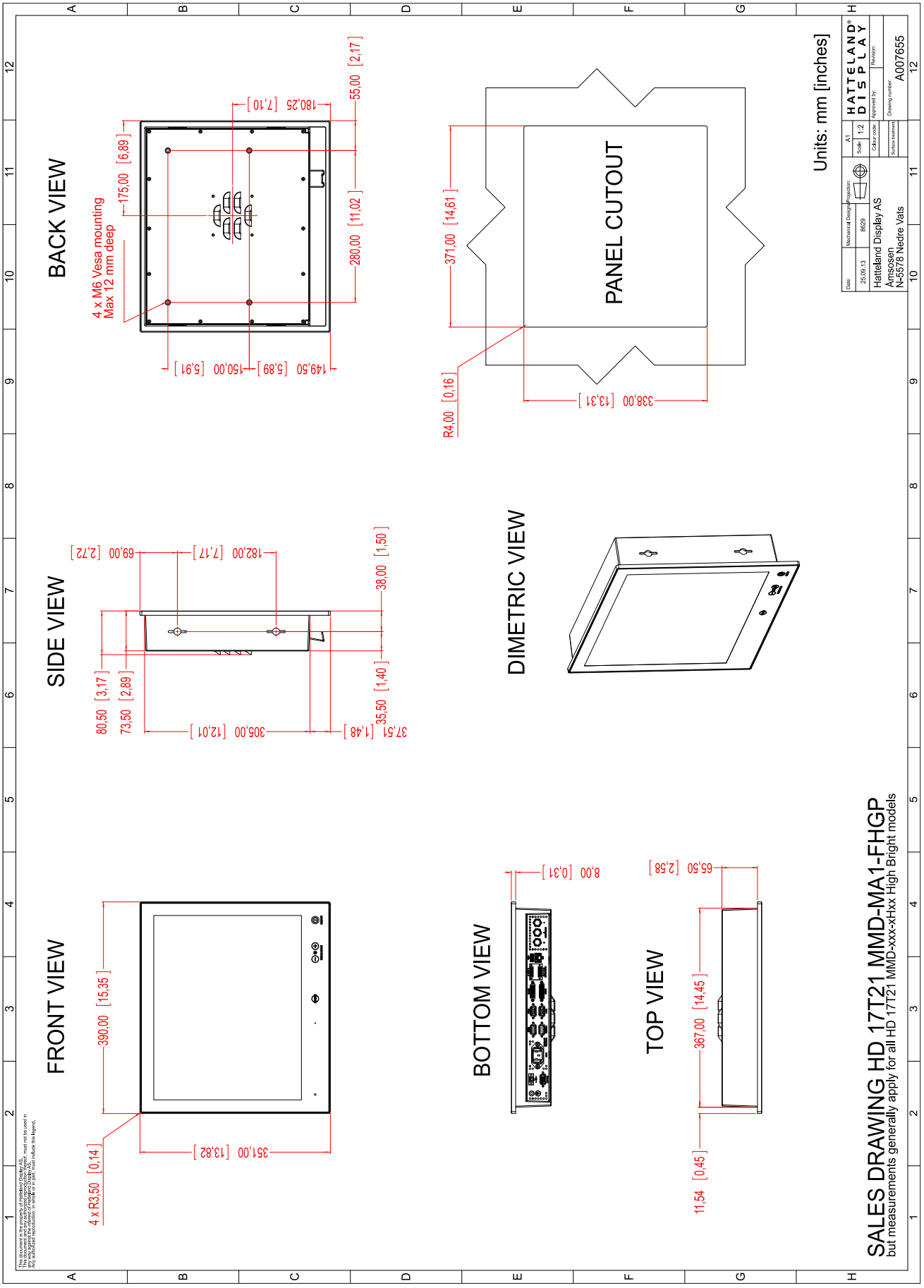
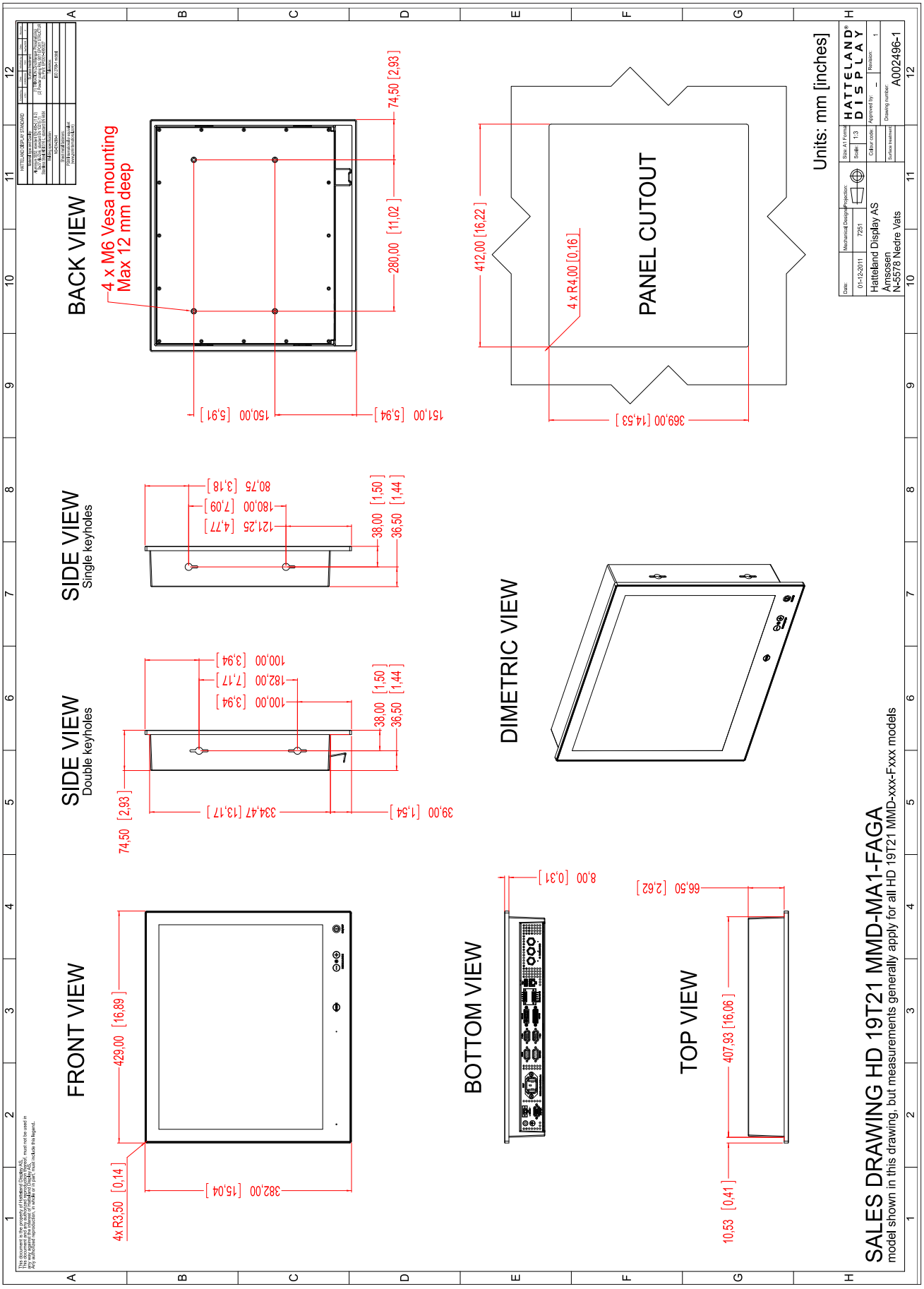
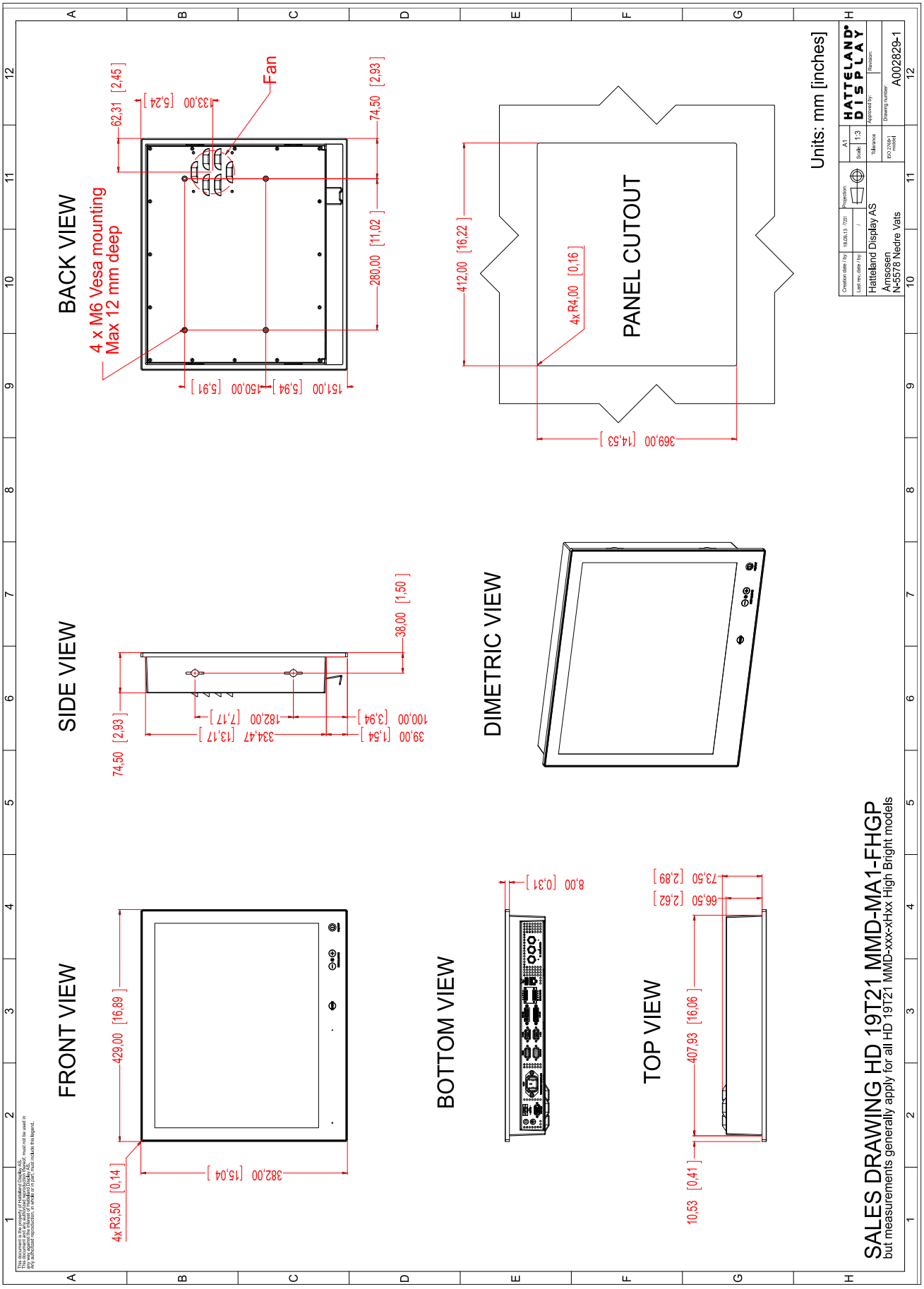
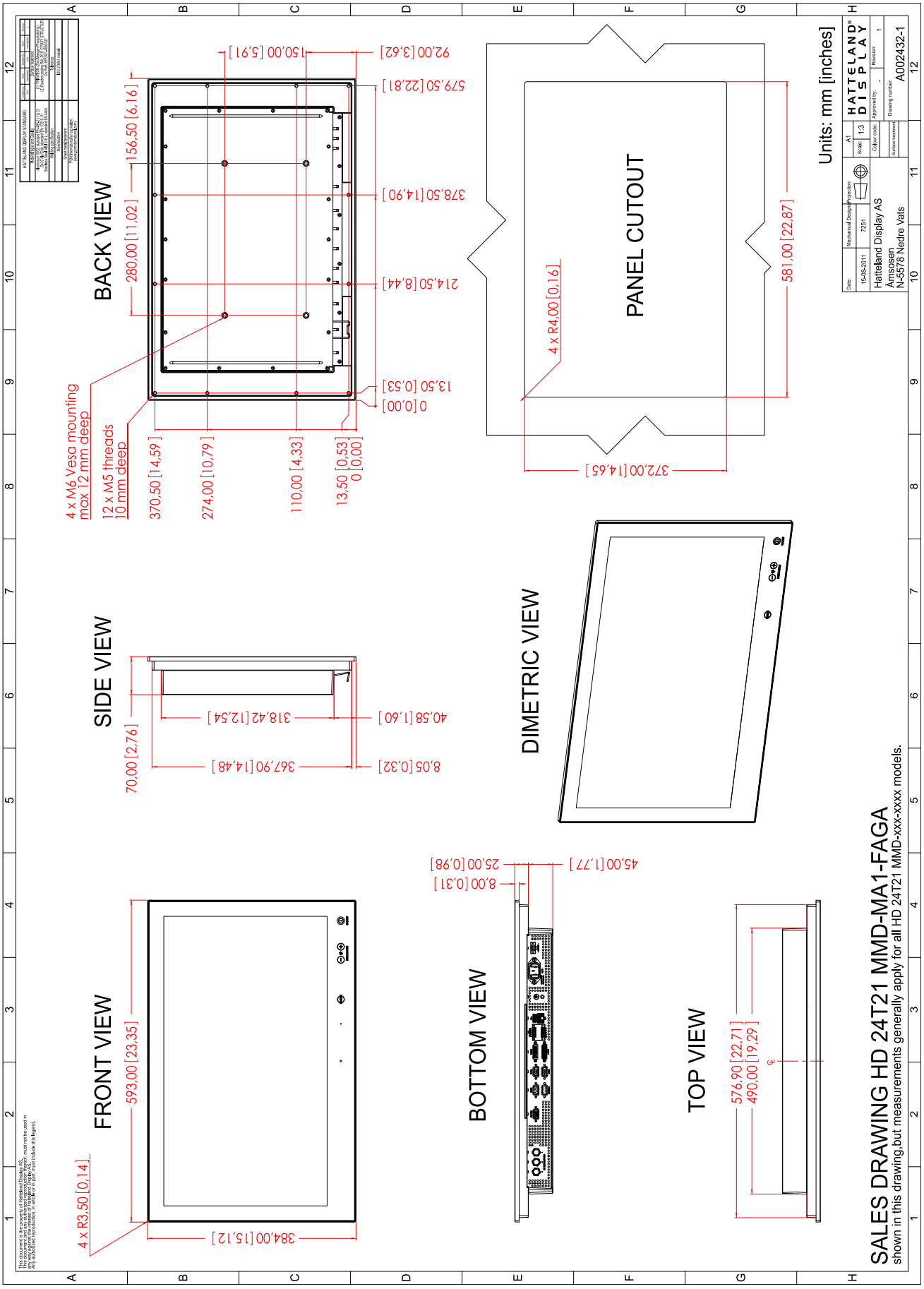


Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

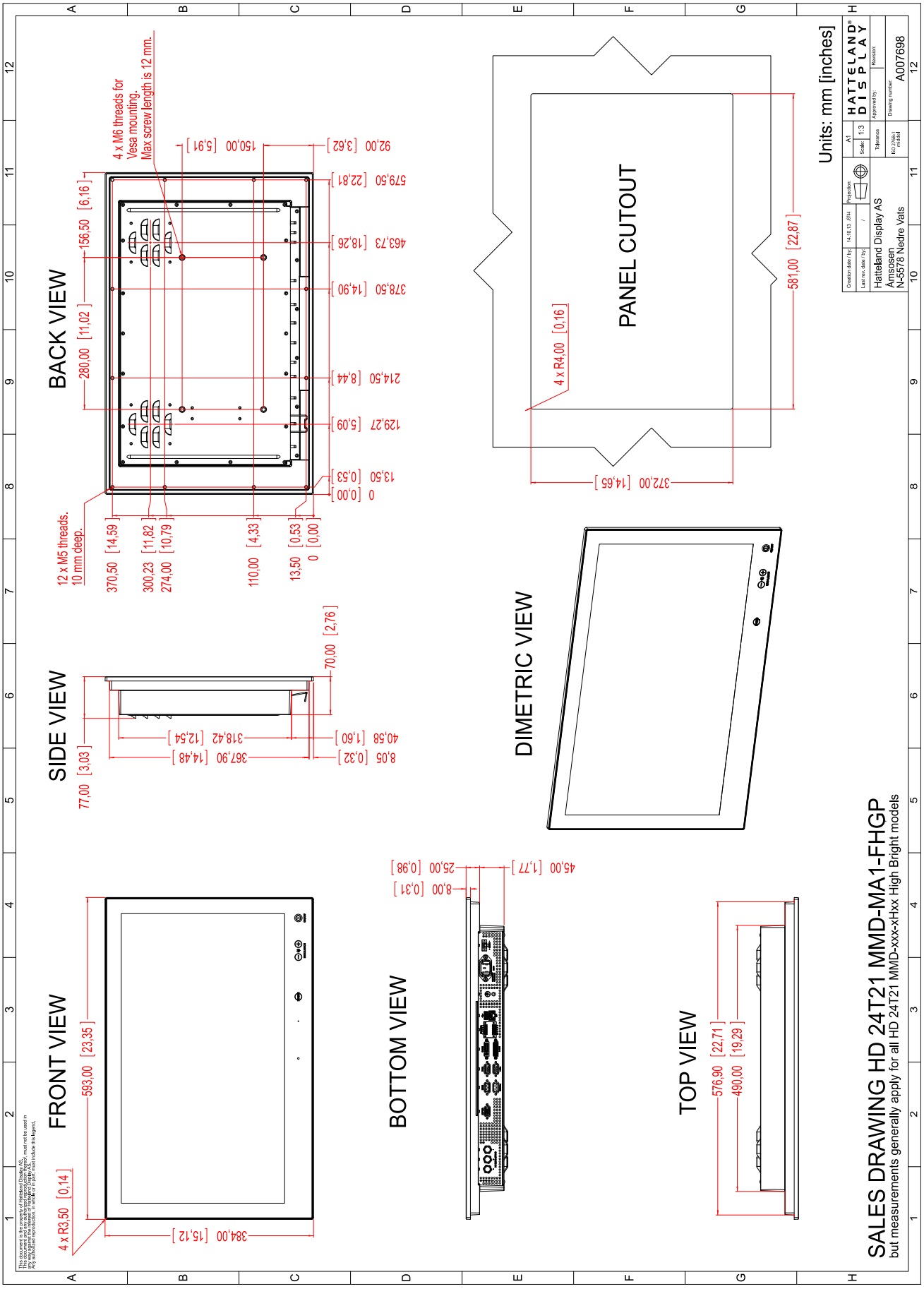




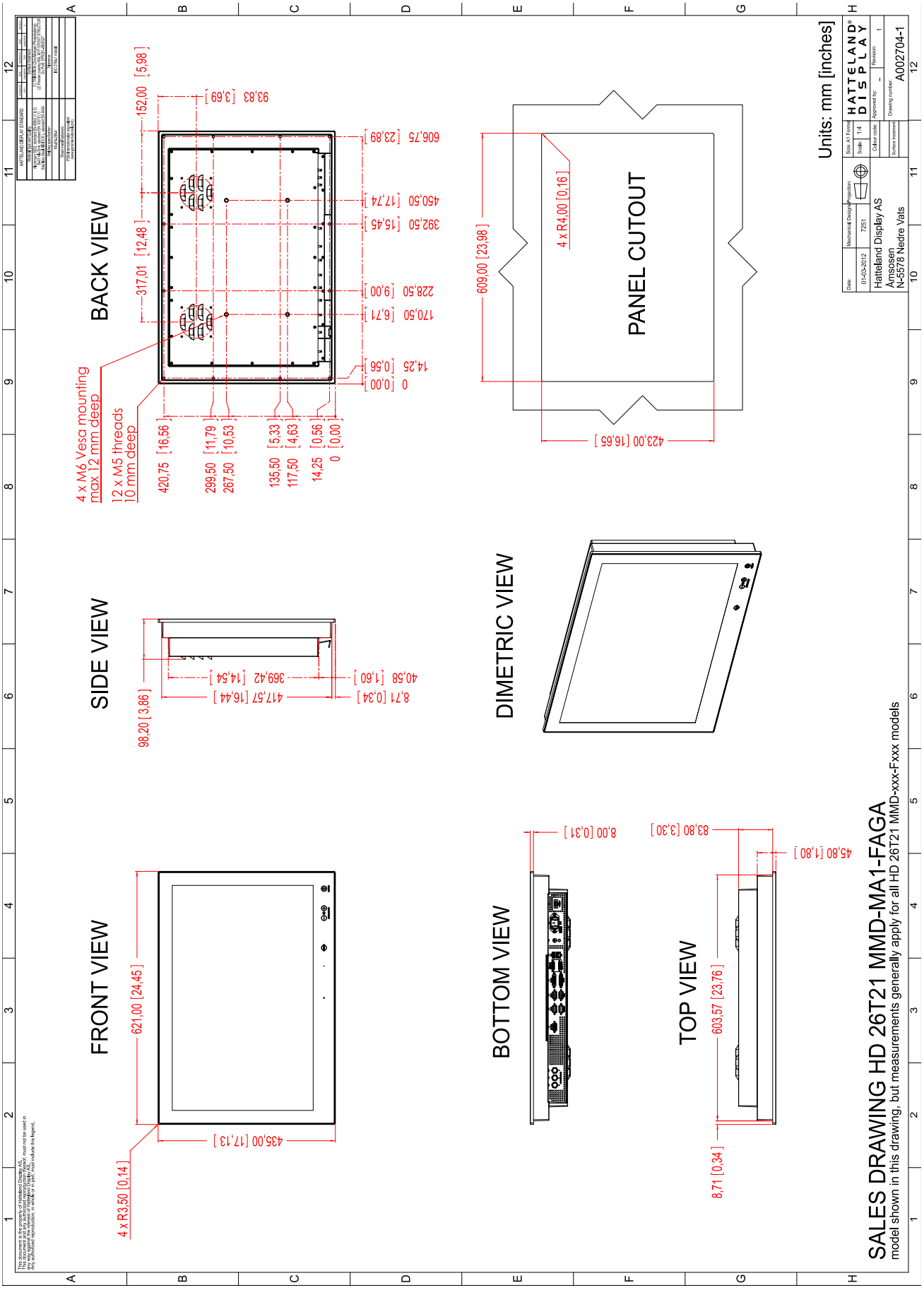
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.



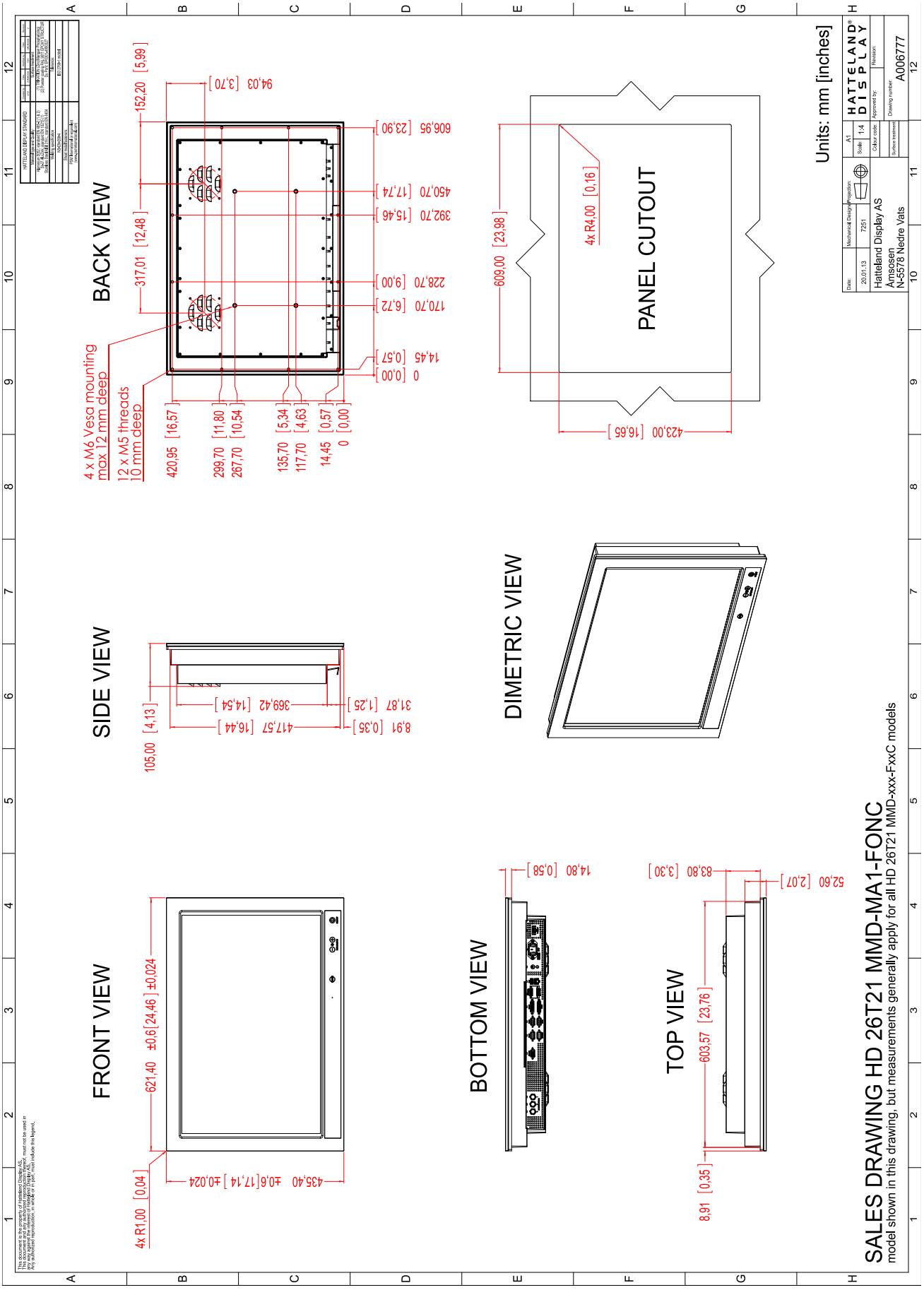
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.



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.



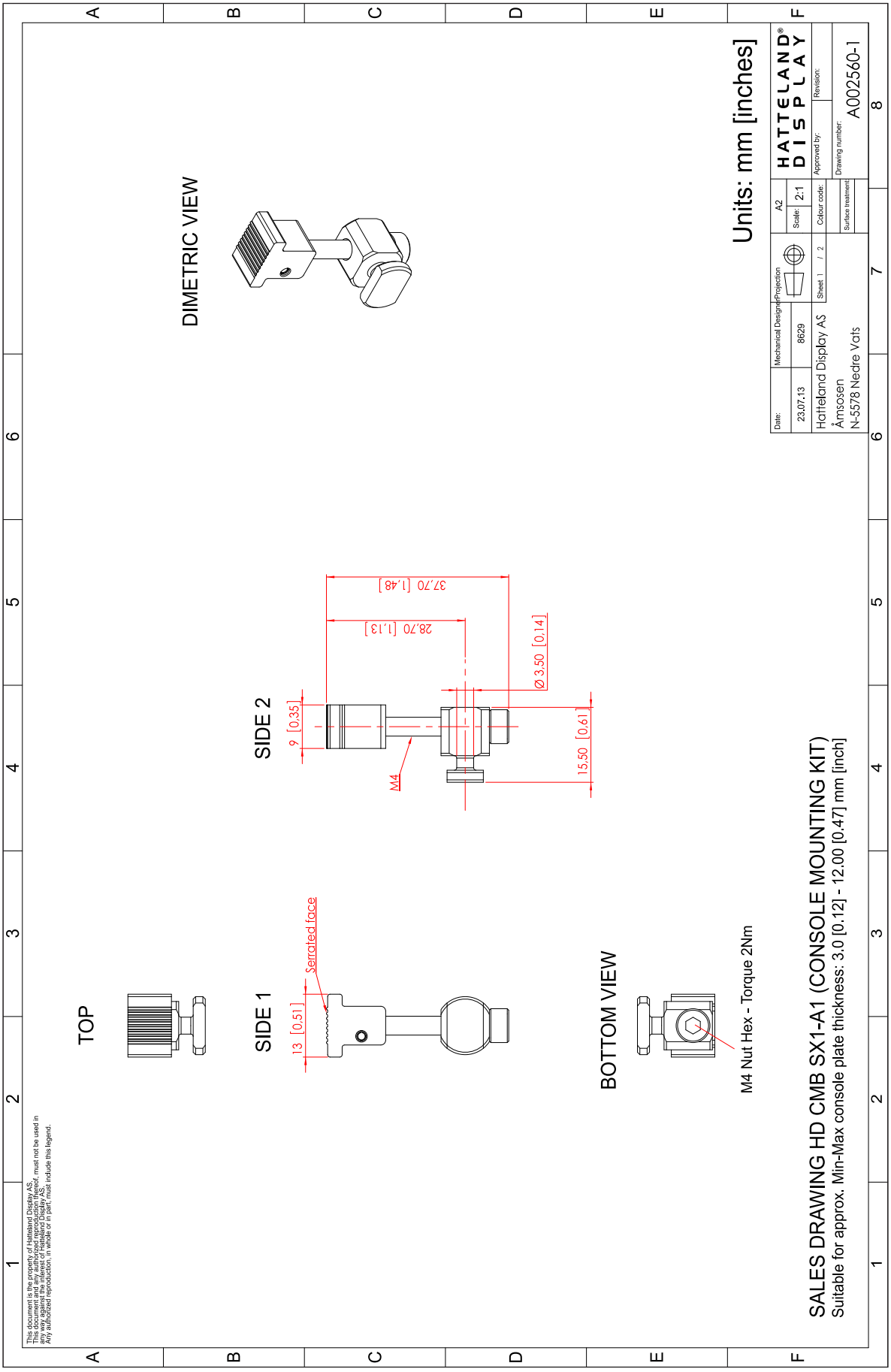
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.



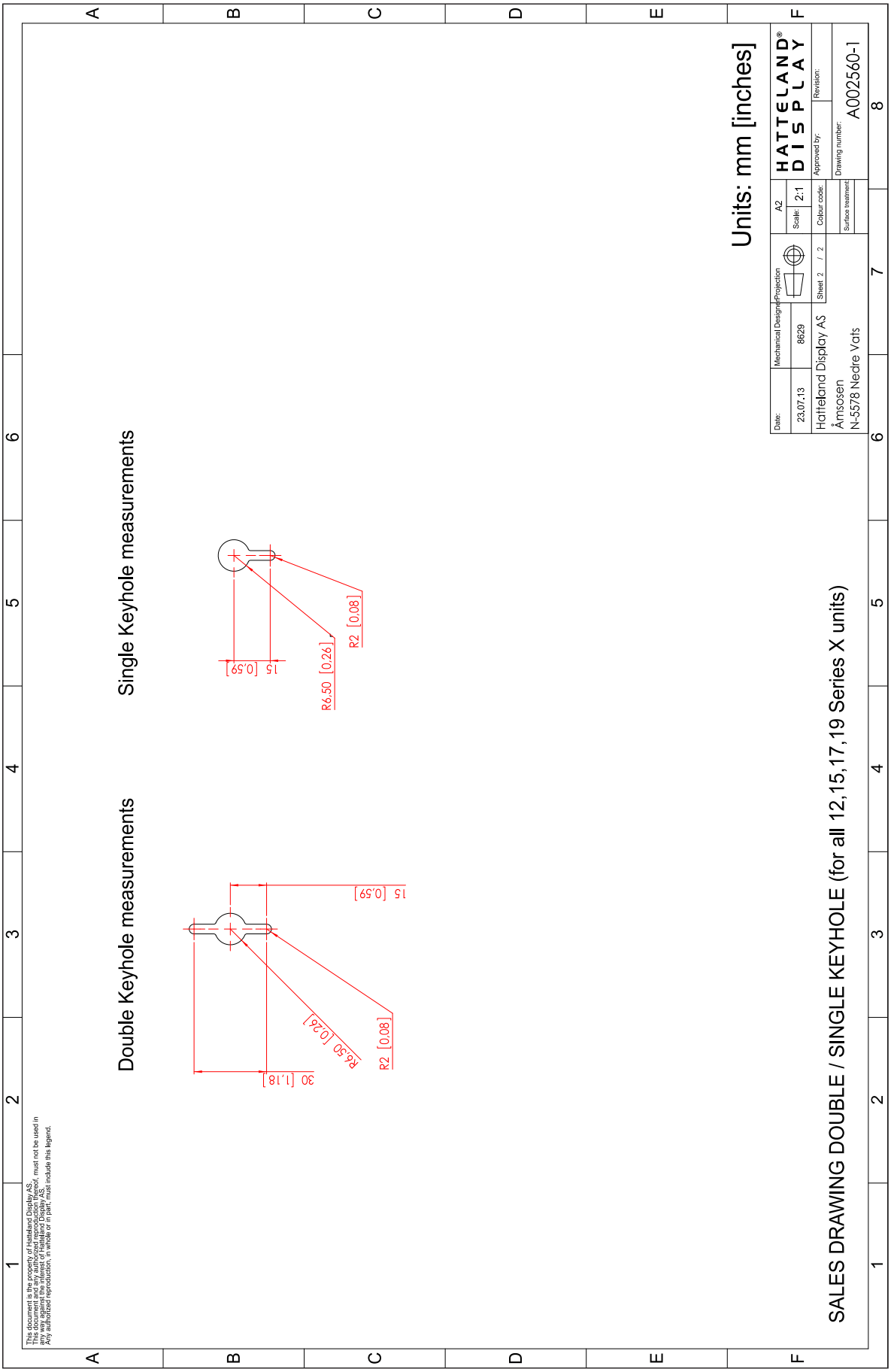
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

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.

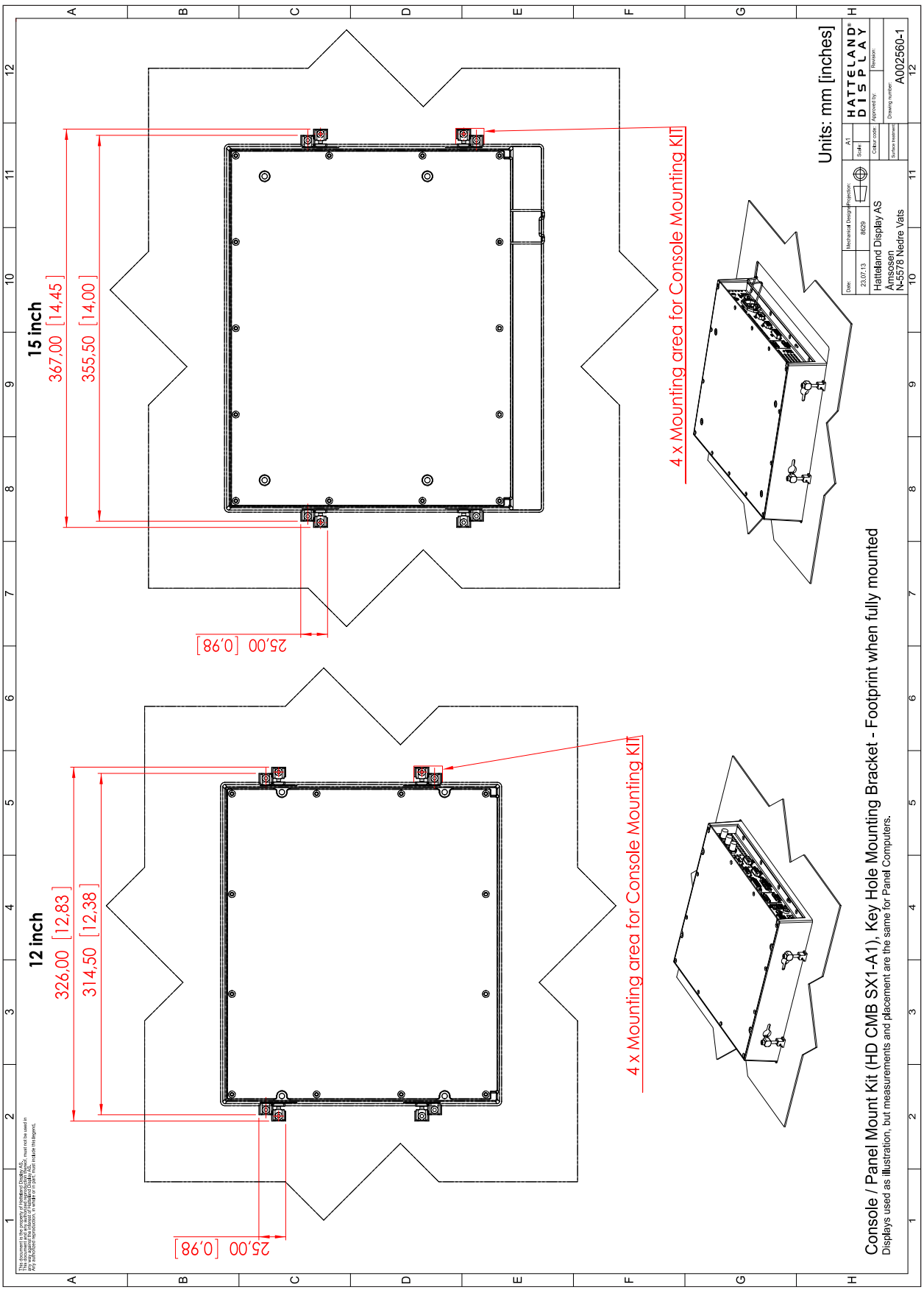


Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.



Technical Drawings - HD CMB SX1-A1 (for Double Key Hole)

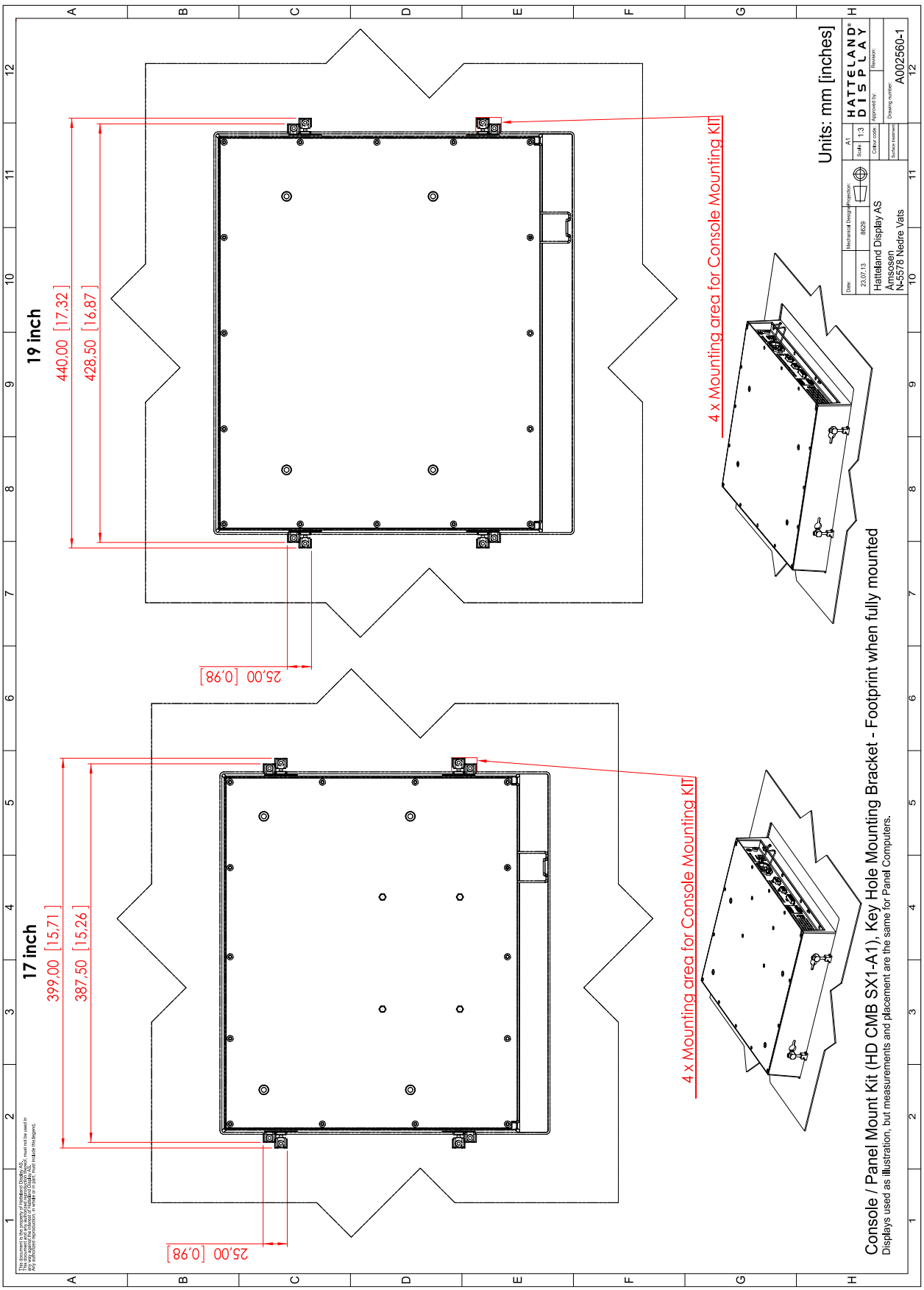
Drawing shows the occupied measurements when brackets are fully mounted.



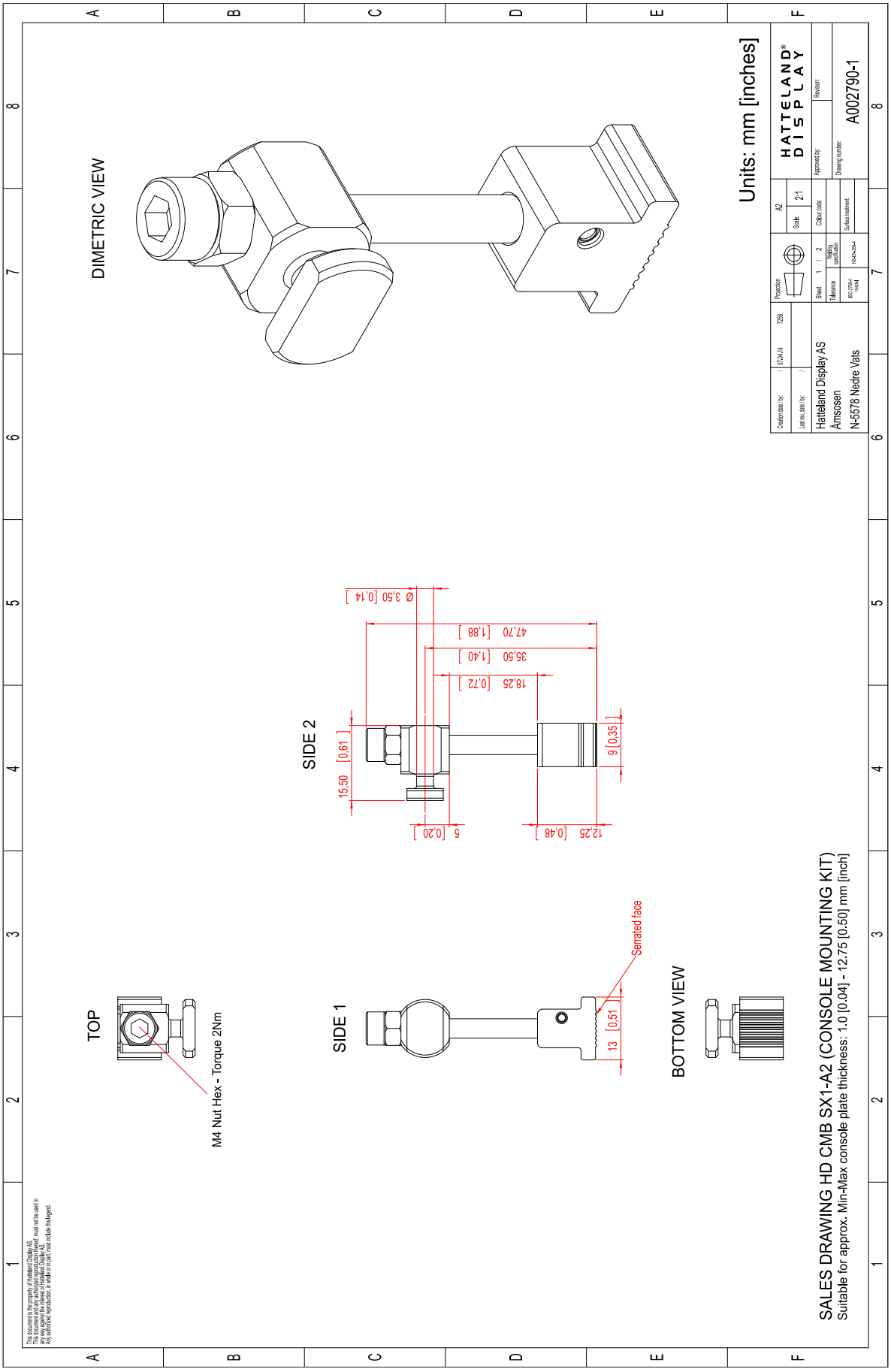
Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

Technical Drawings - HD CMB SX1-A1 (for Double Key Hole)

Drawing shows the occupied measurements when brackets are fully mounted.



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.



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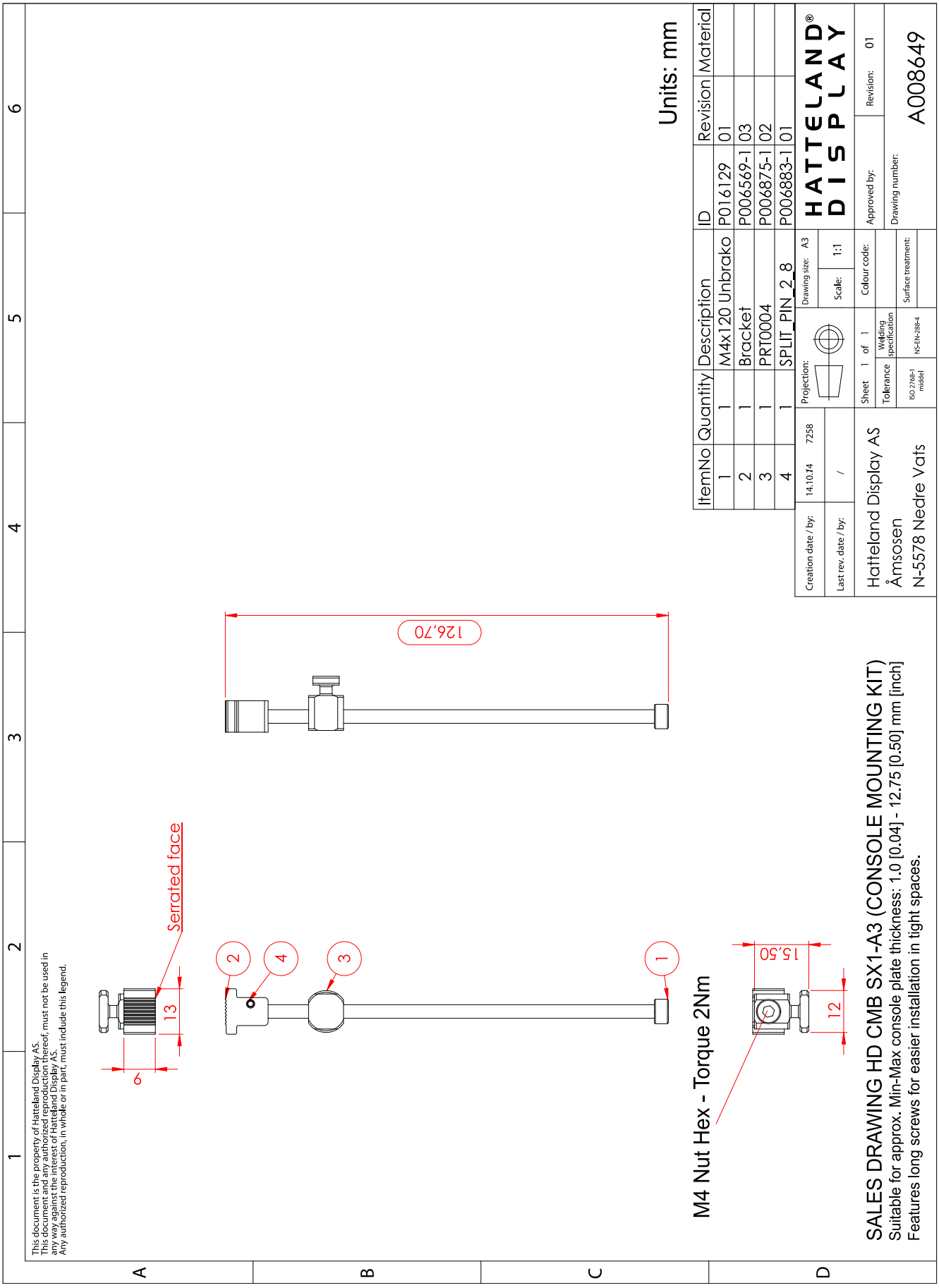

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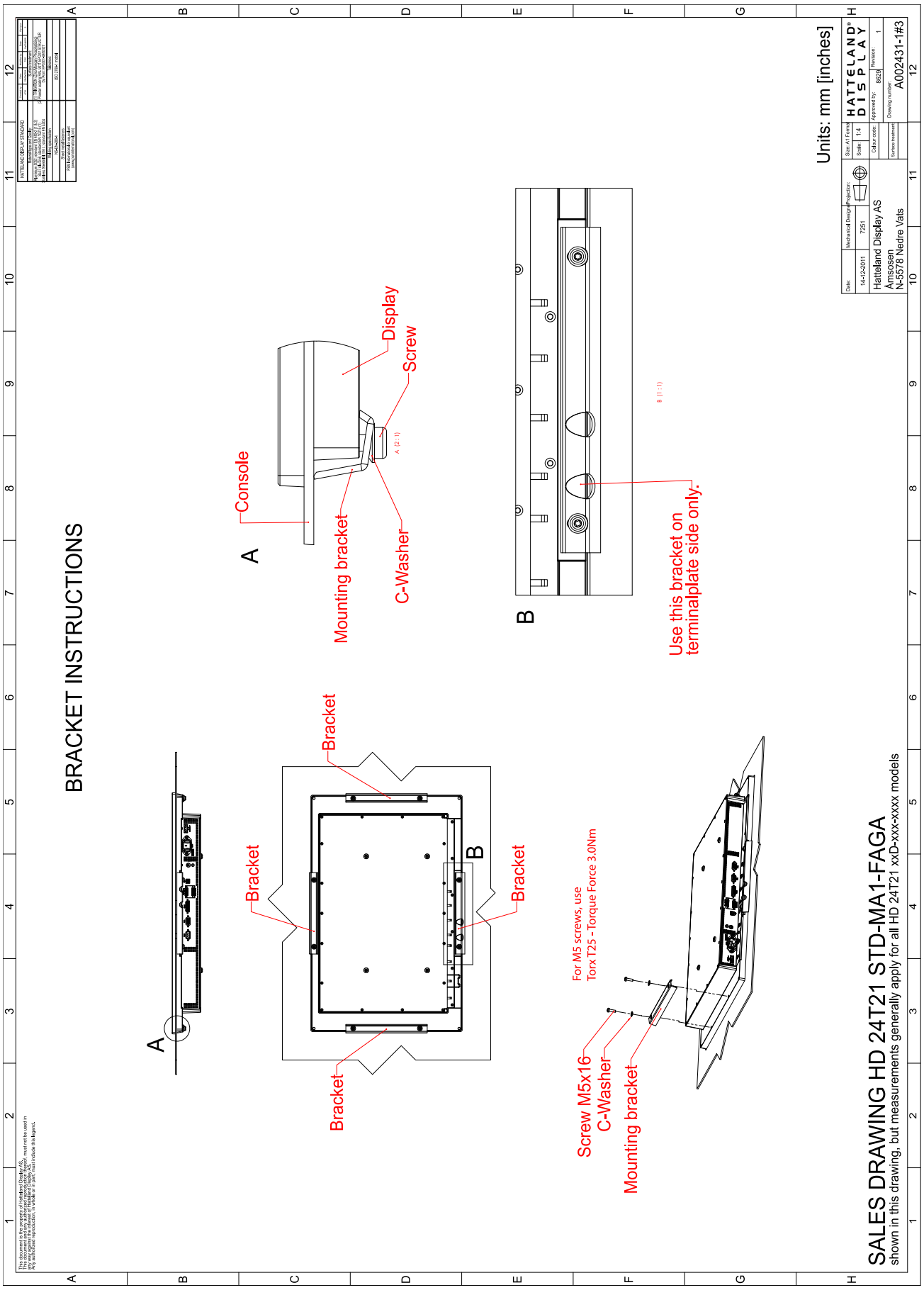

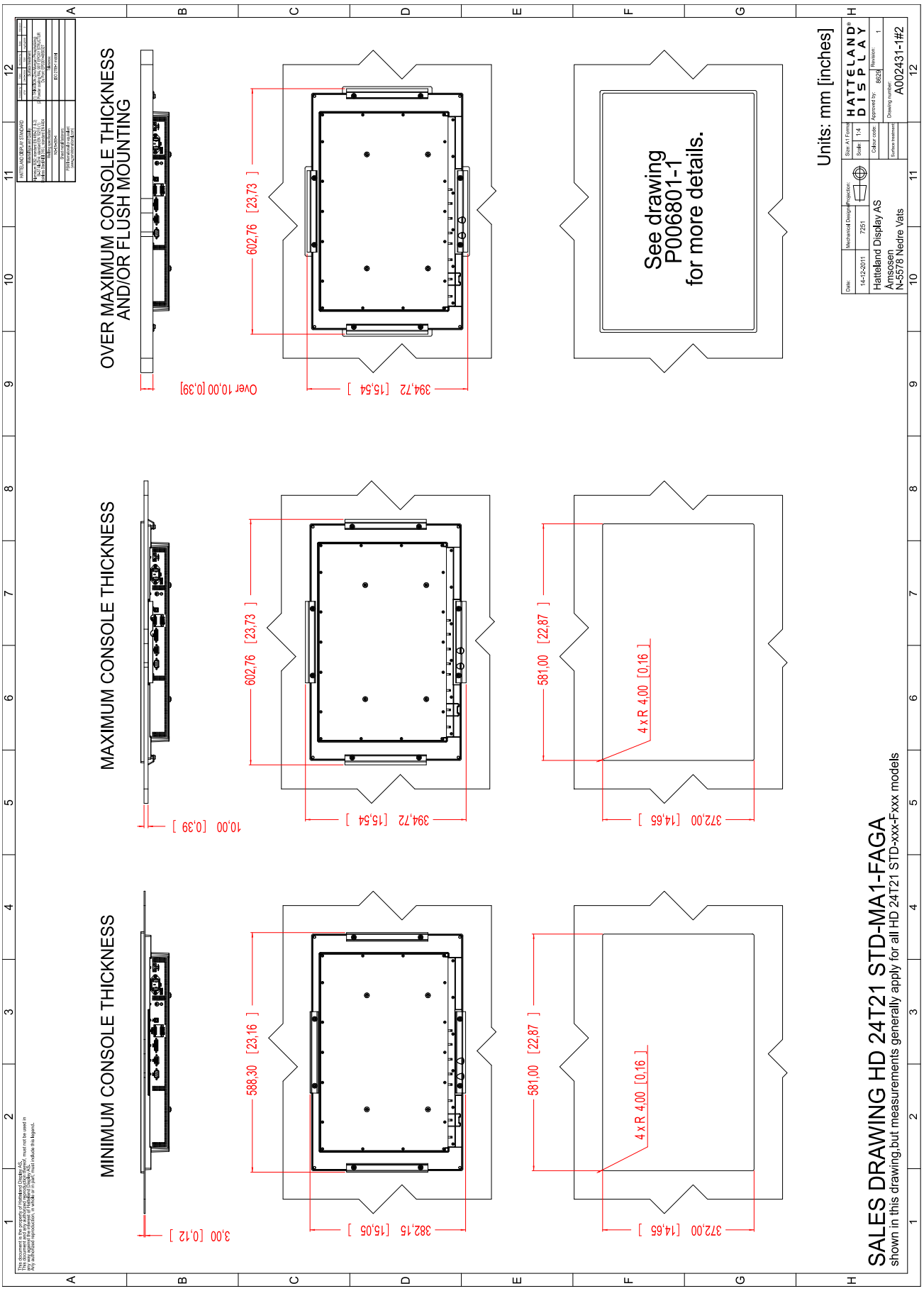

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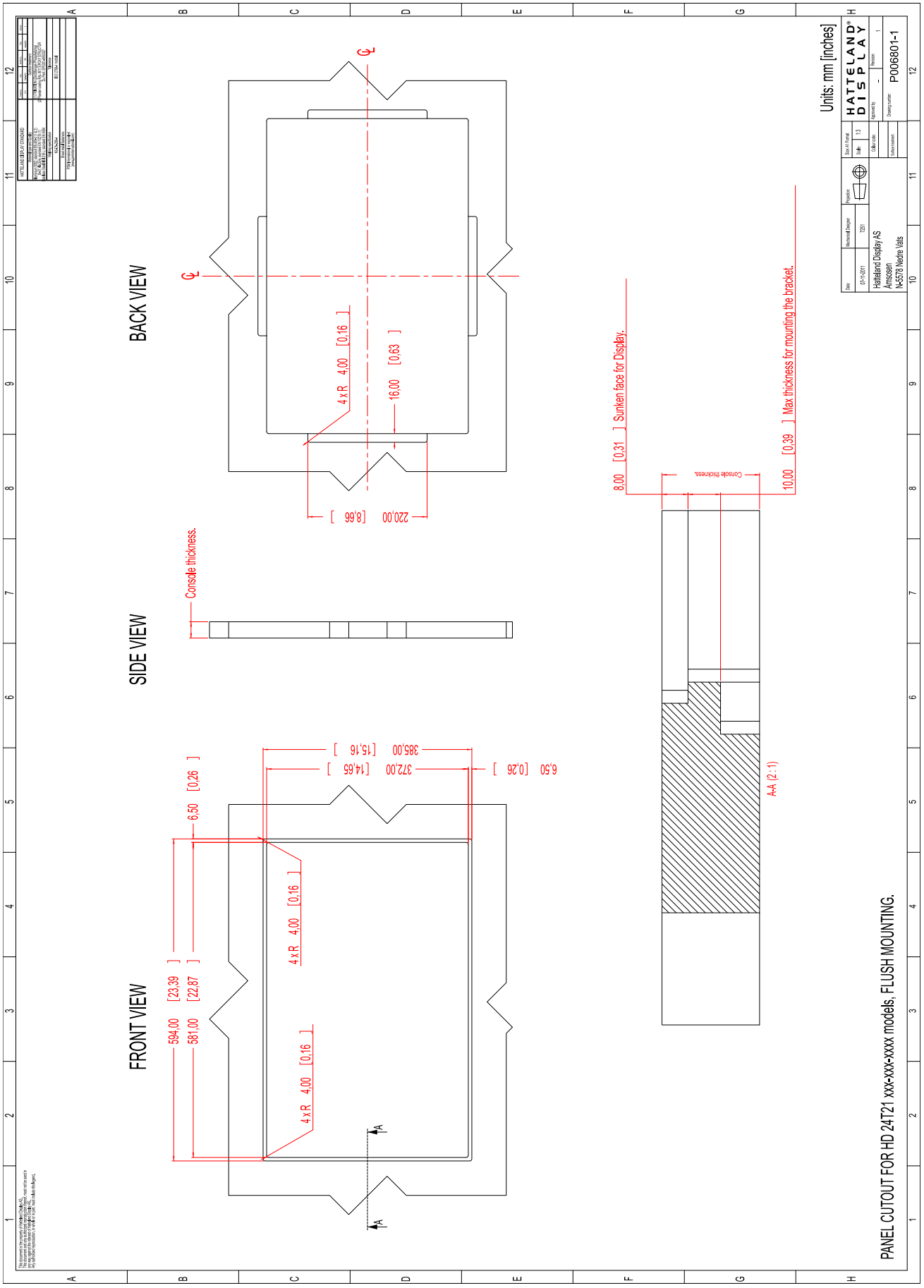

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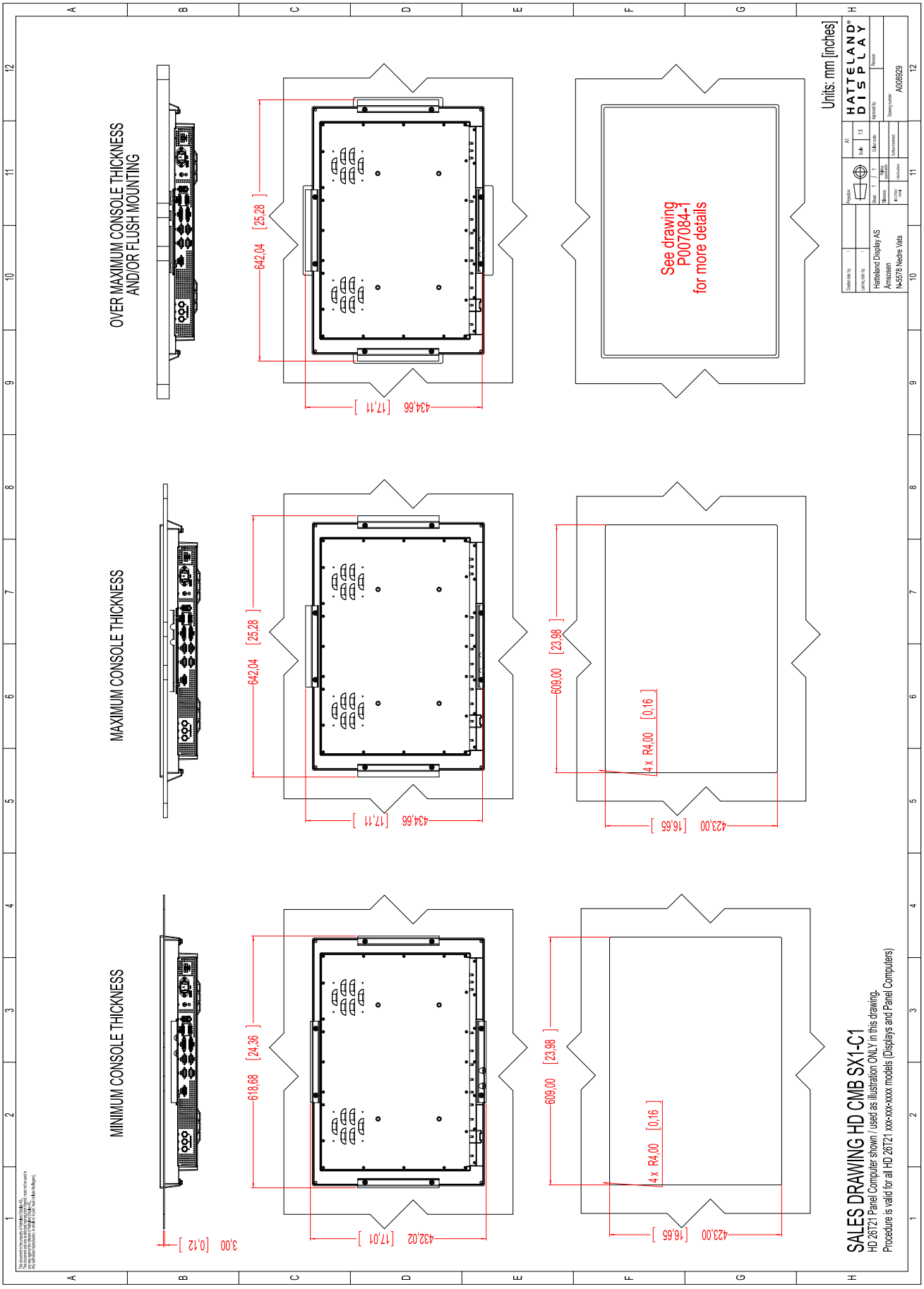

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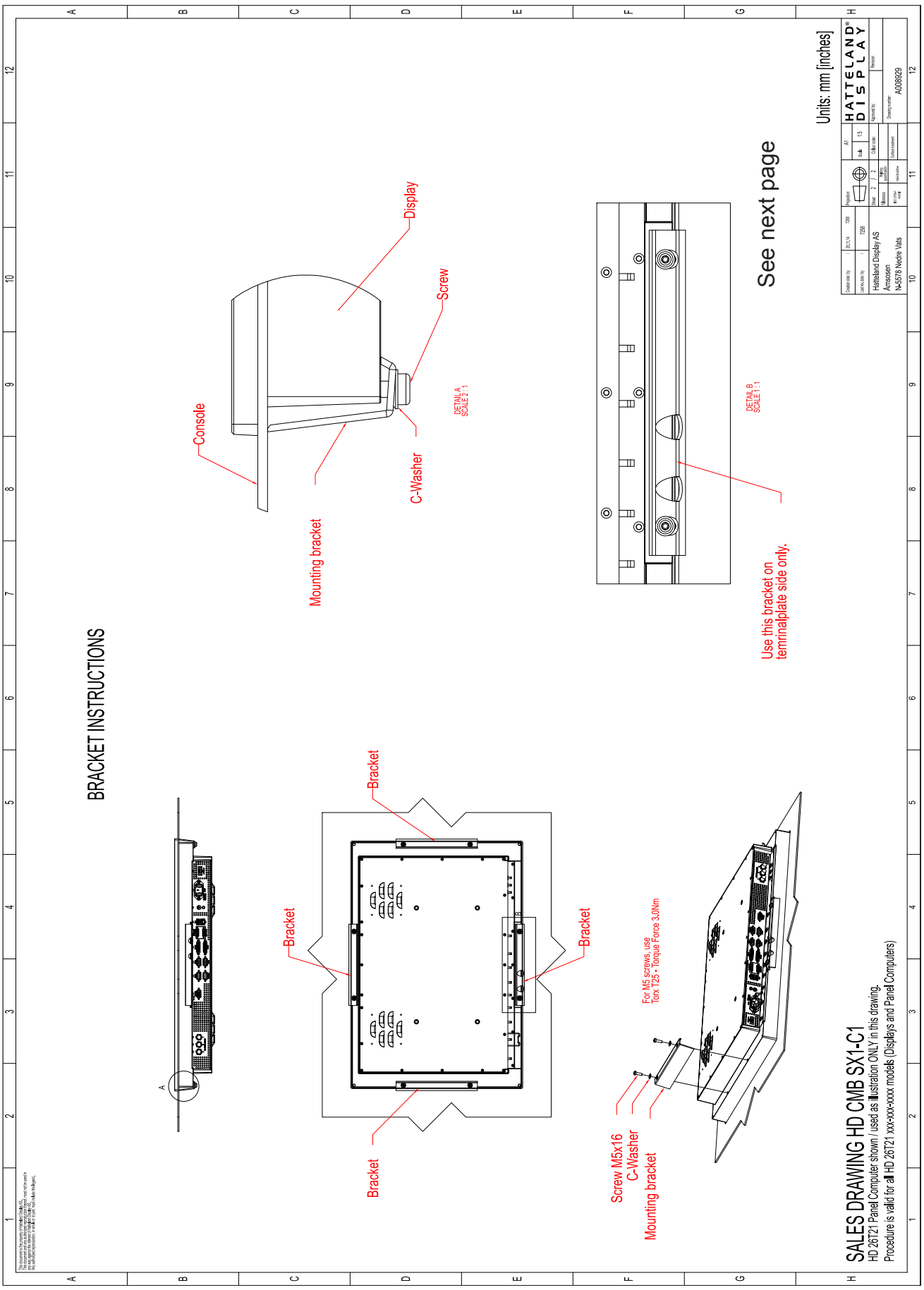

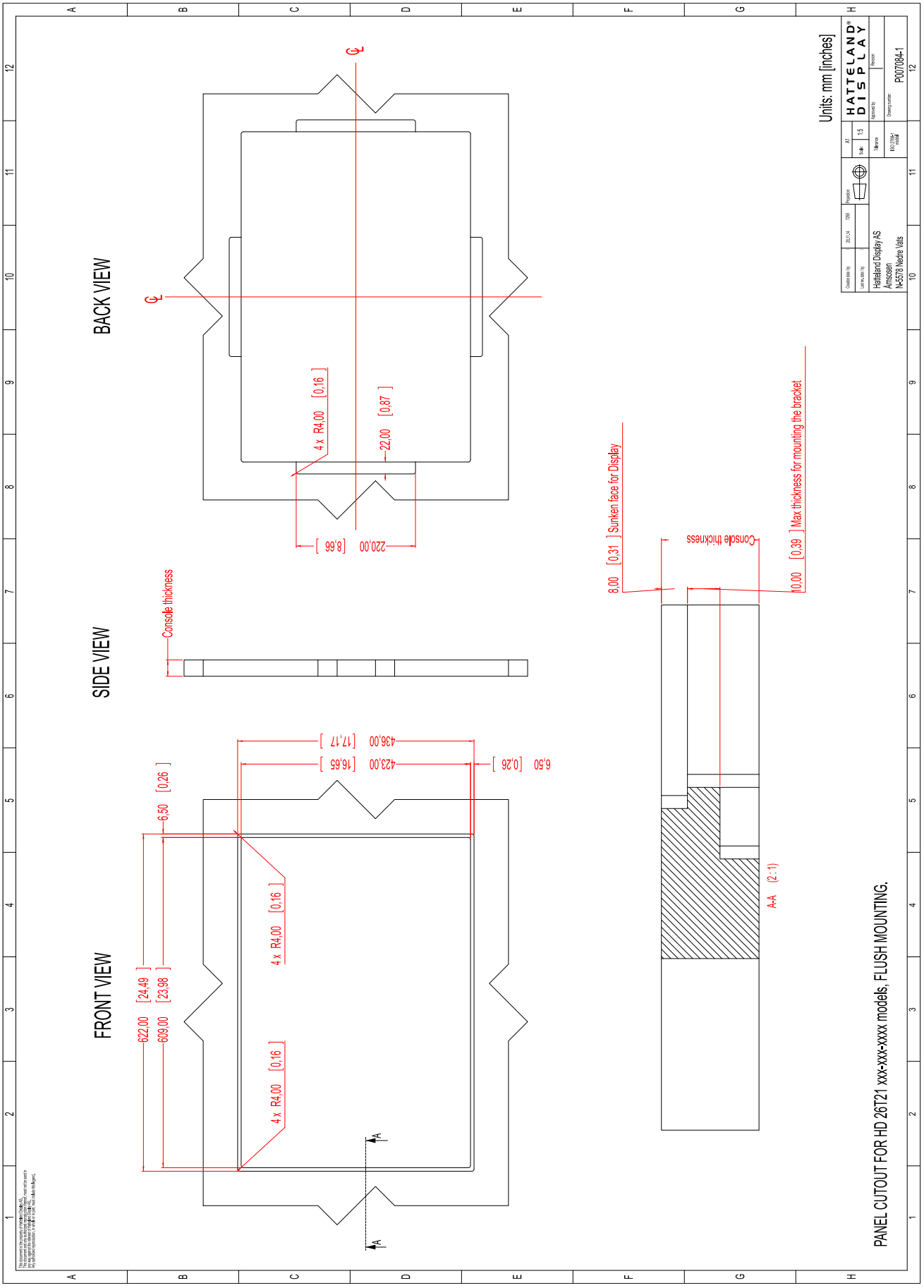

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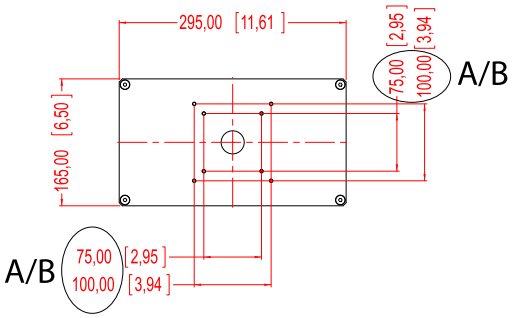
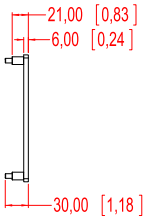
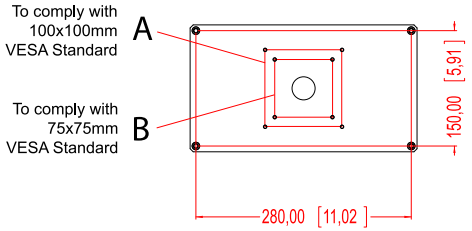
FRONT VIEW



SIDE VIEW



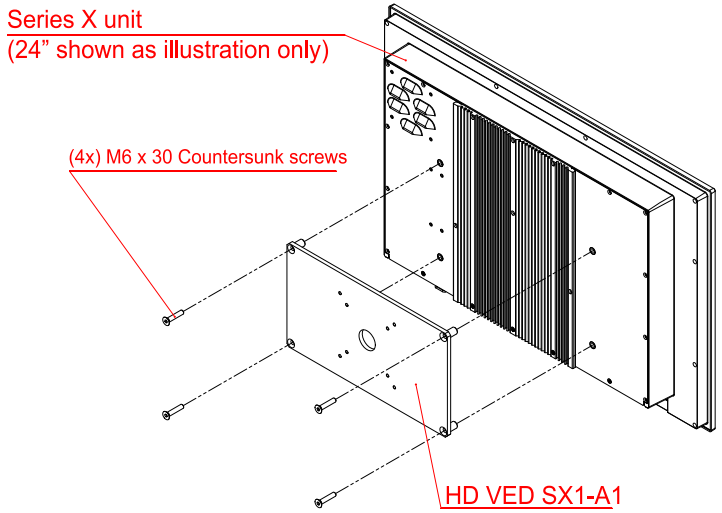
BACK VIEW



BOTTOM VIEW

TOP VIEW

MOUNTING OF VESA BRACKET

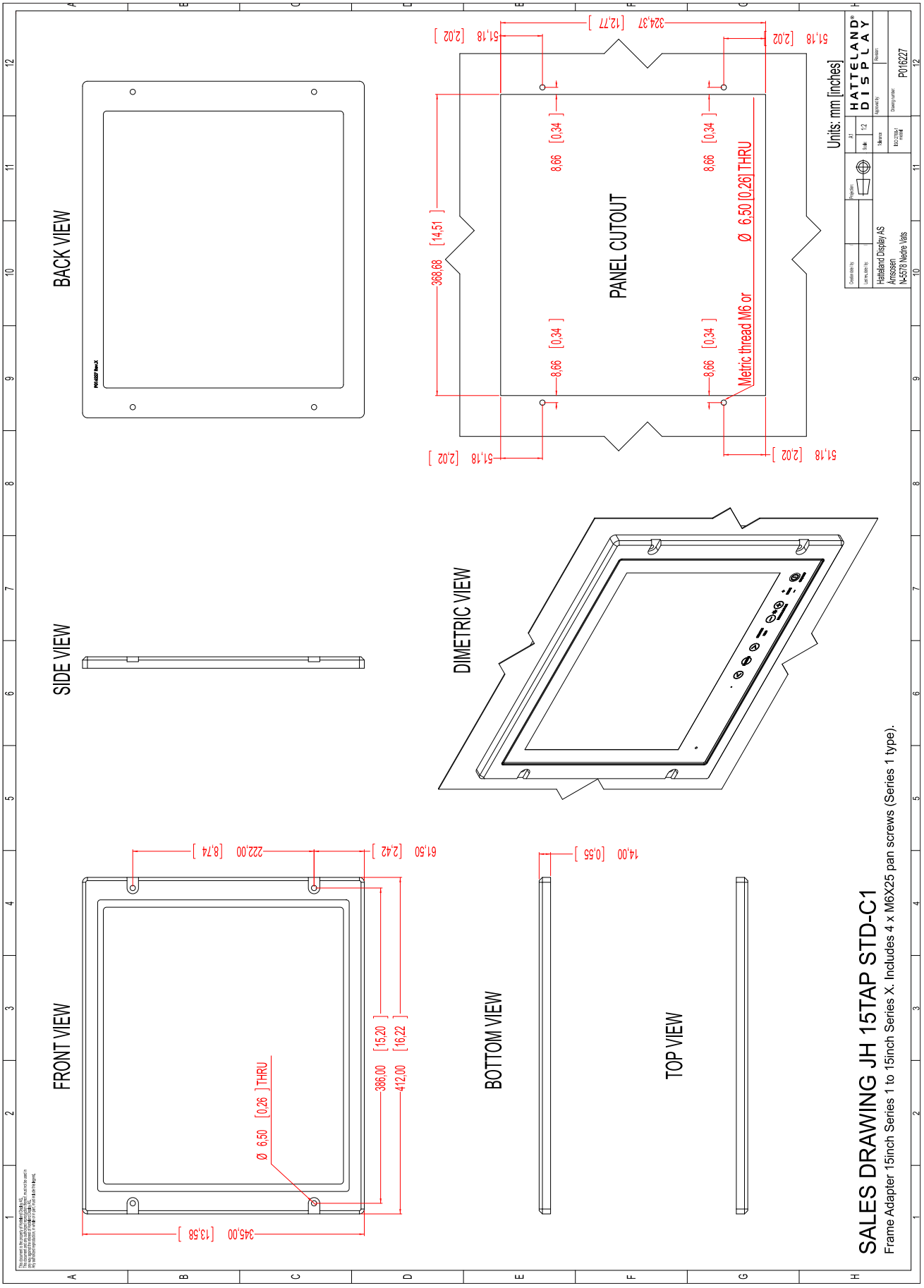


Units: mm [inches]

SALES DRAWING HD VED SX1-A1

This Vesa bracket applies for 12", 15", 17", 19", 24" and 26" Series X units.

Date:	Mechanical Design	Projection:	A1	HATTELAND DISPLAY
17.09.12	7251		Scale: 1:3	
Hatteland Display AS Åmsosen N-5578 Nedre Vats			Colour code:	Approved by: 7251 Revision: 02
			Surface treatment:	Drawing number: A006282



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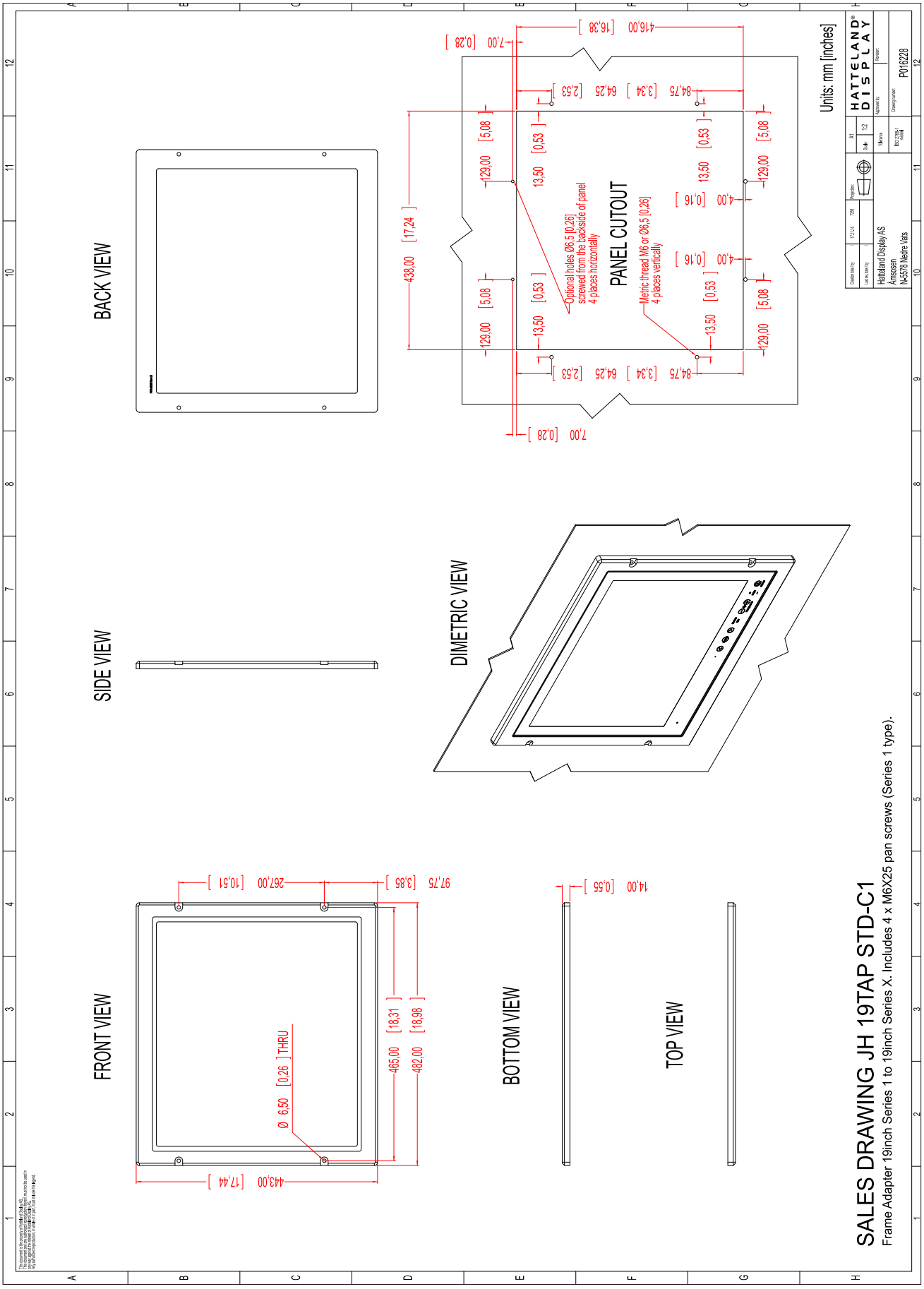

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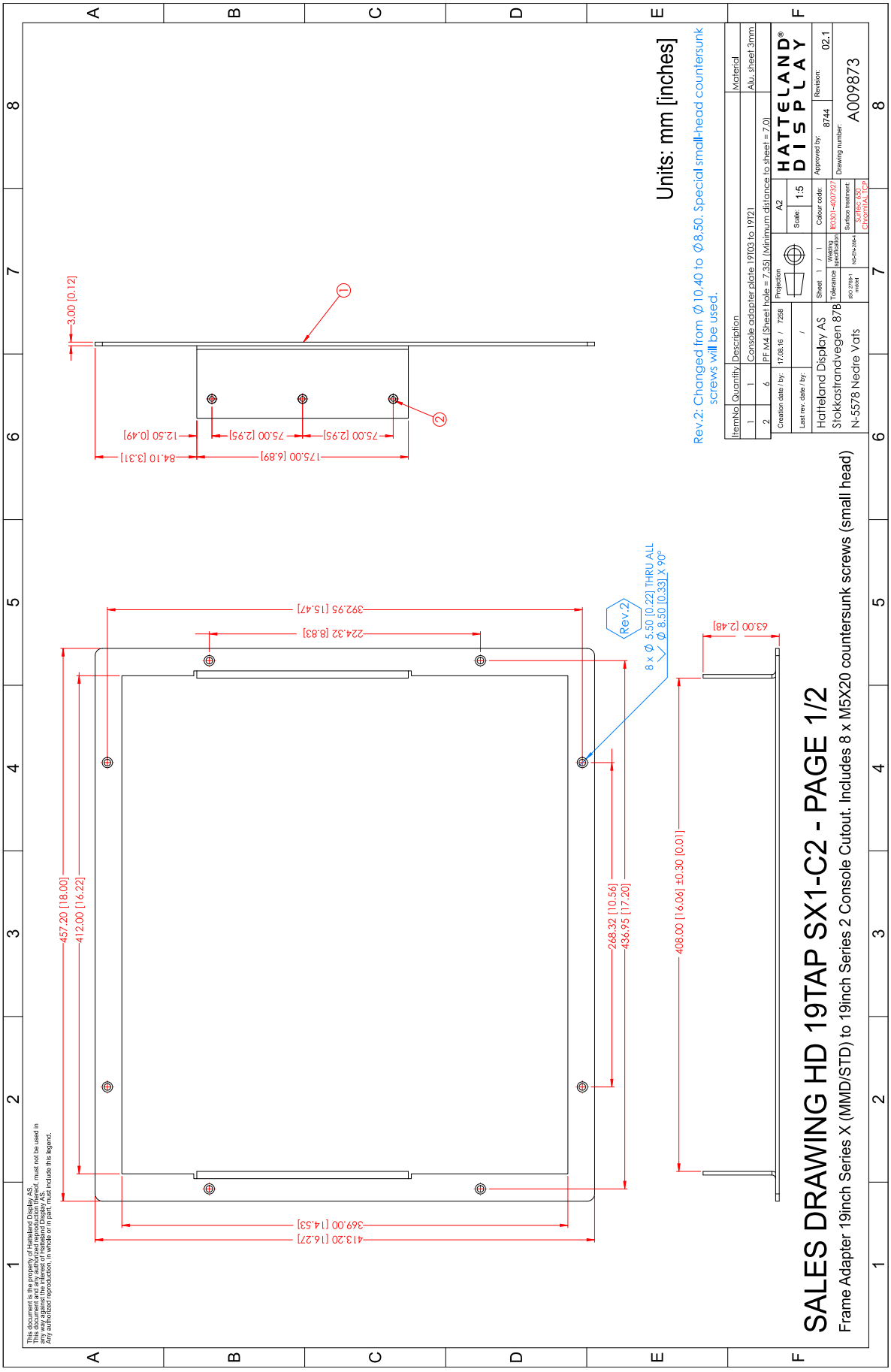

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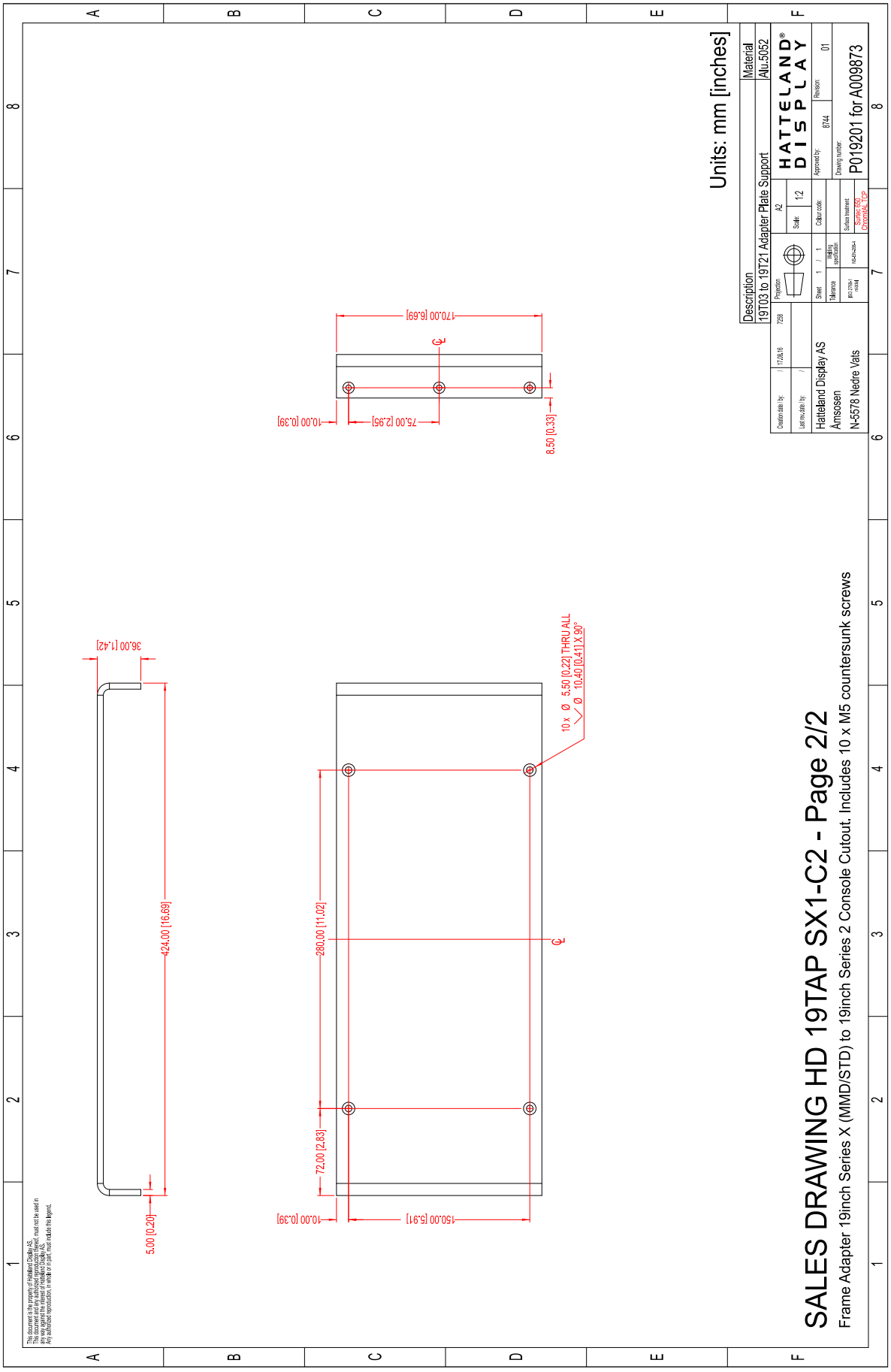

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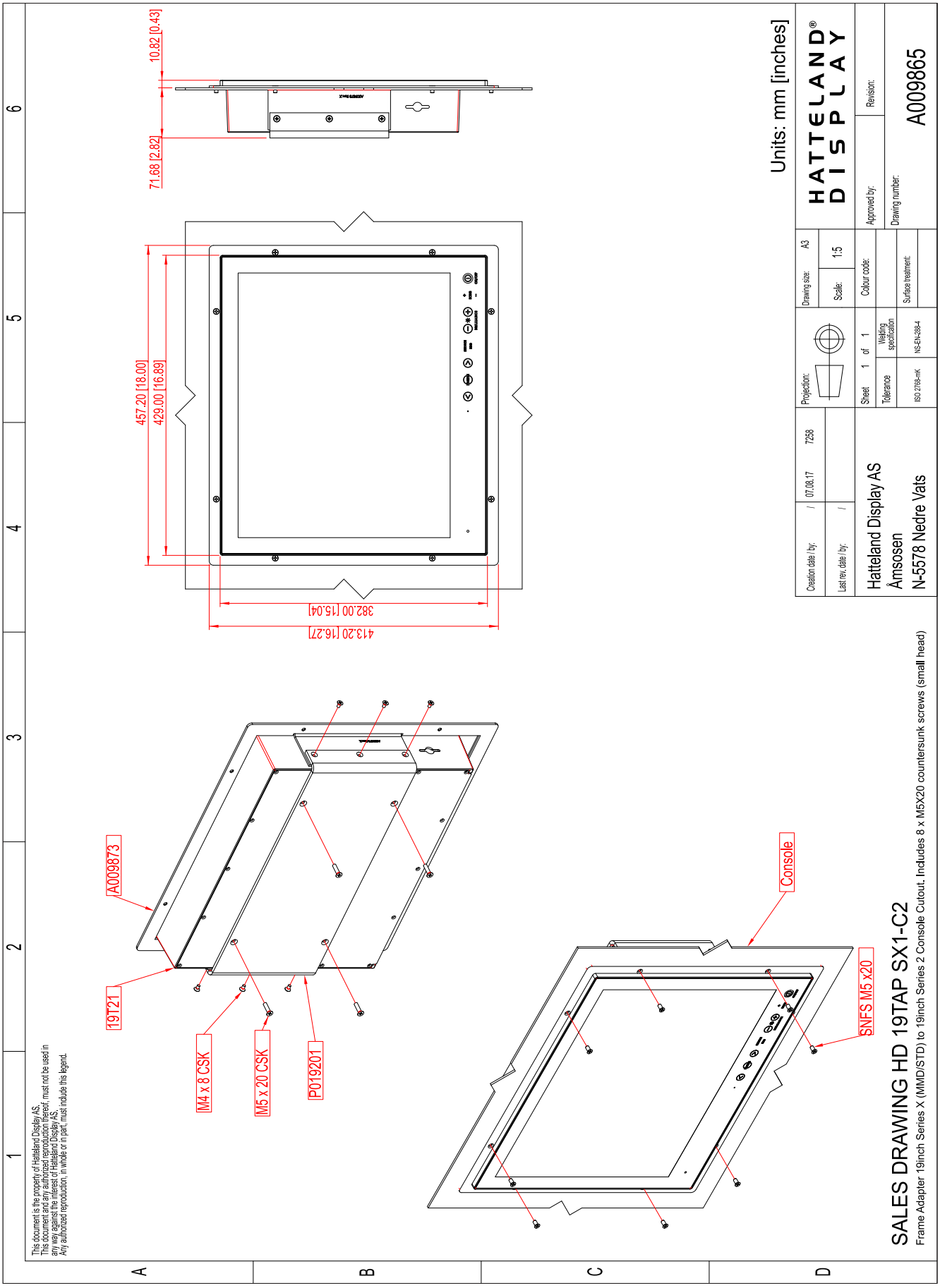

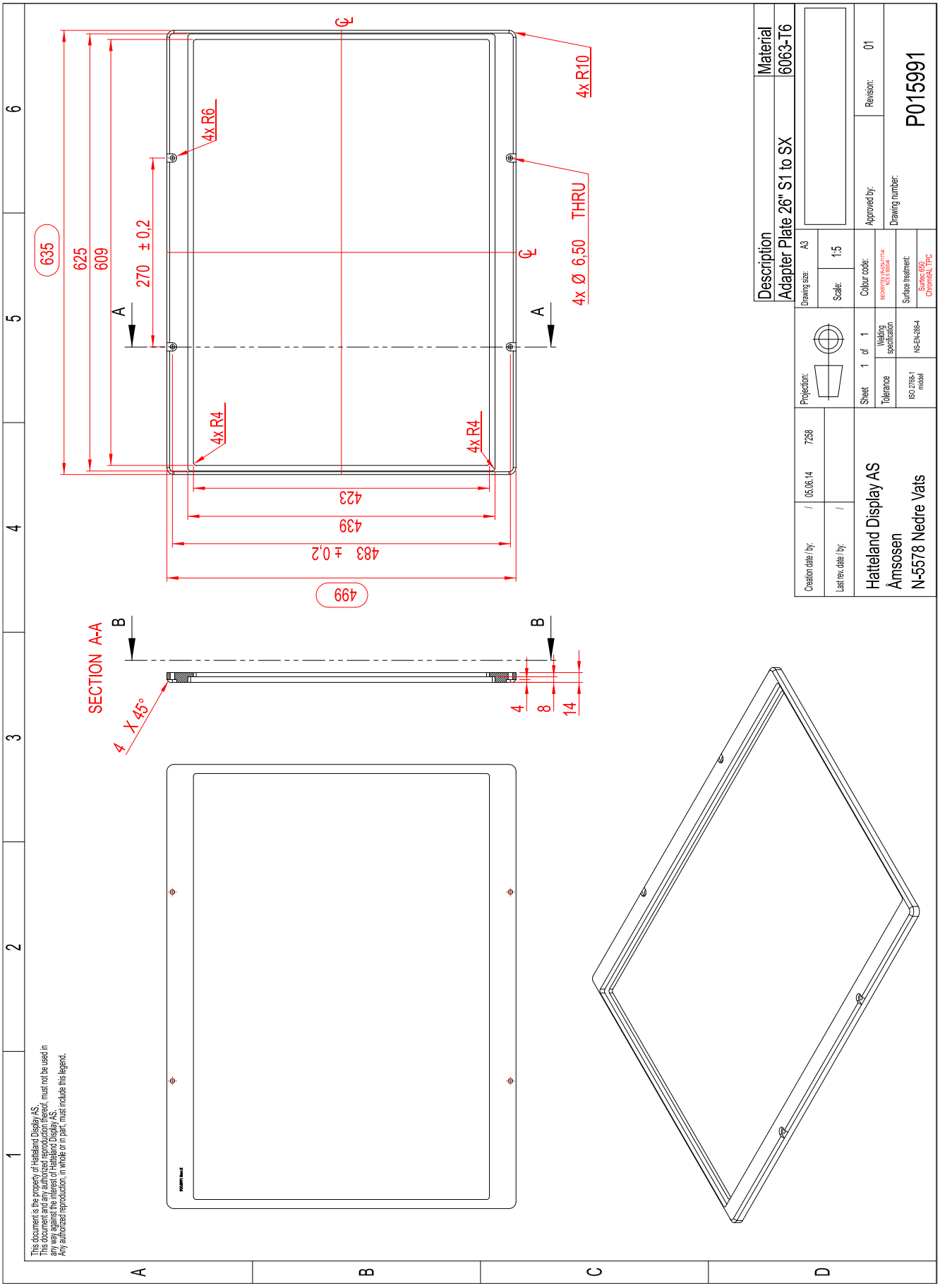

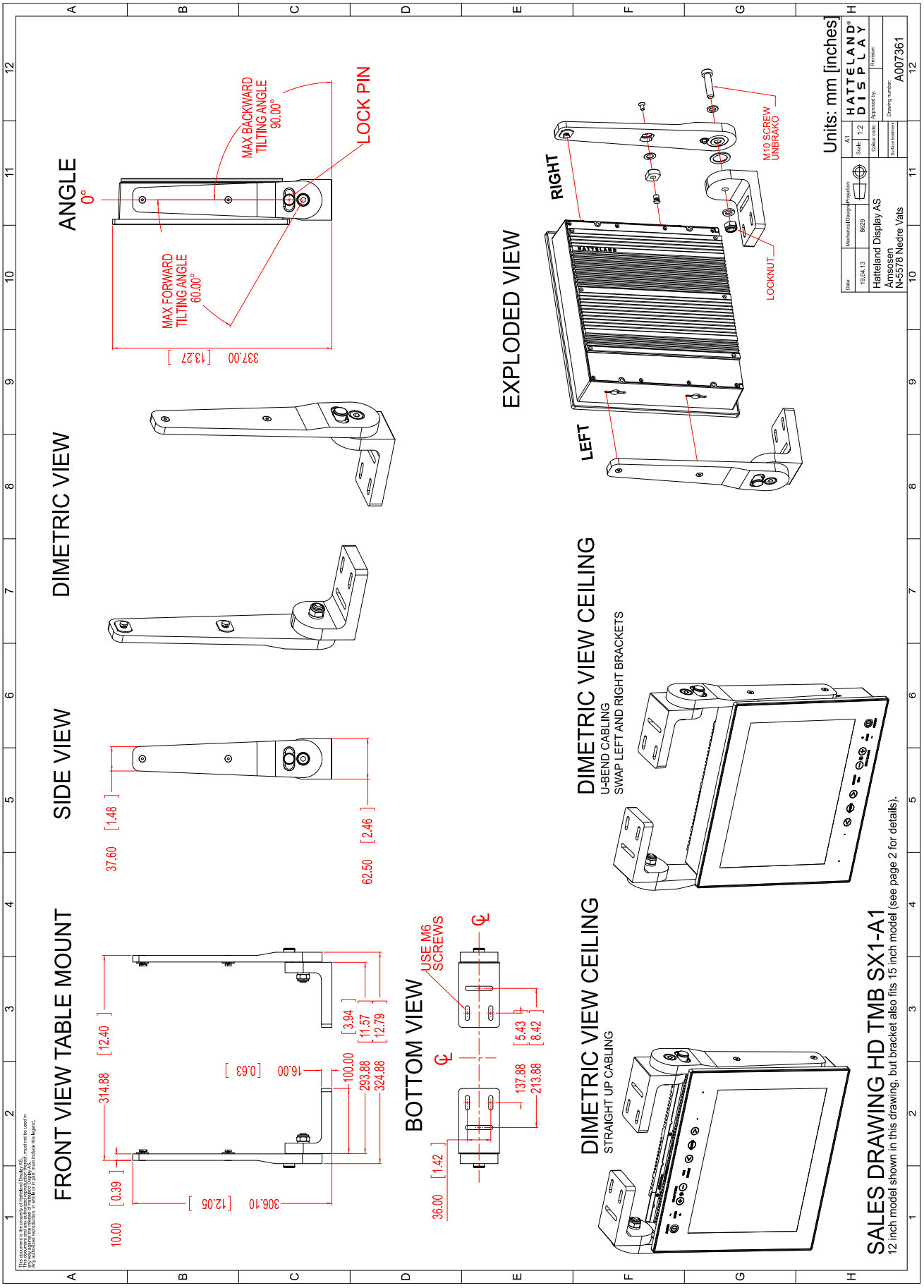

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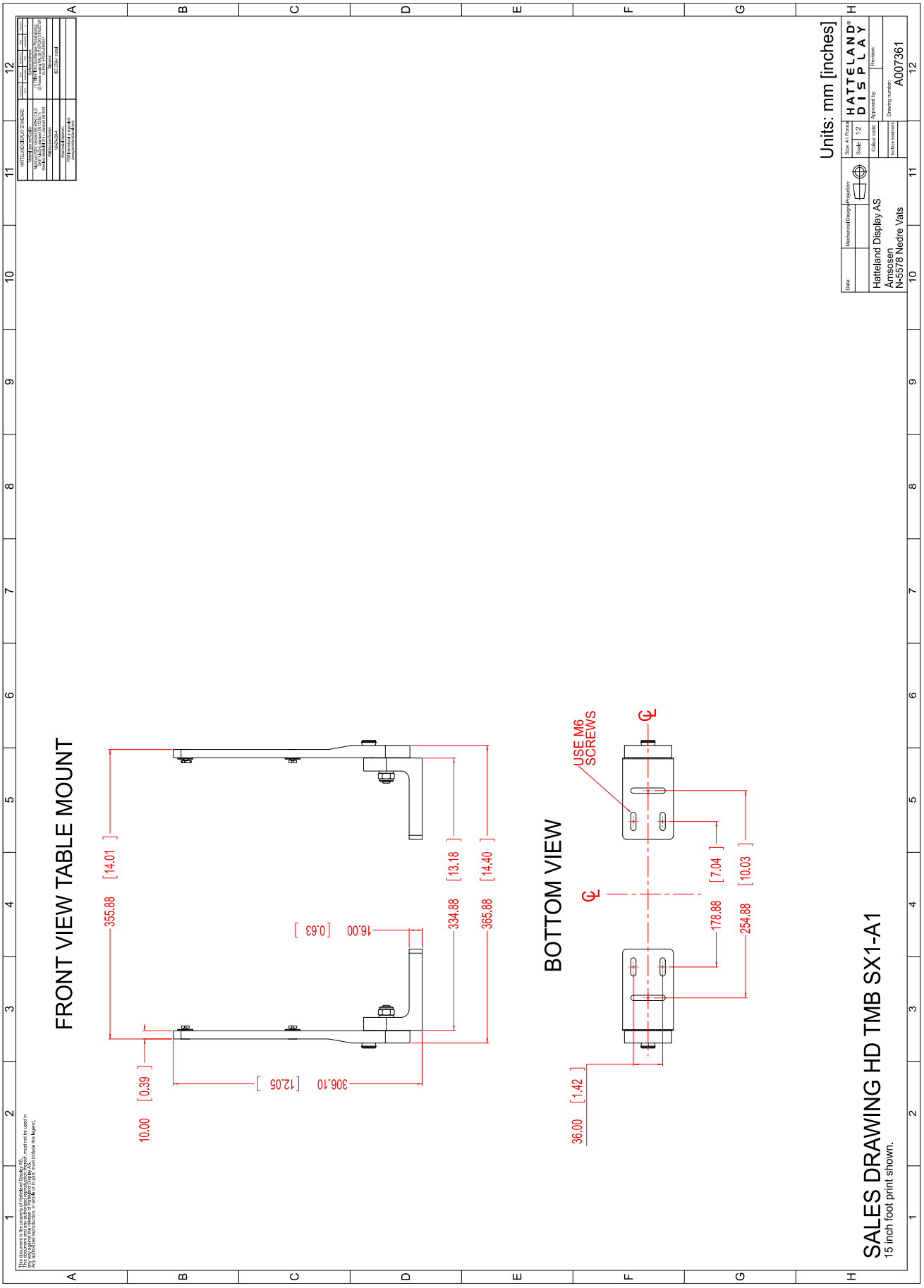

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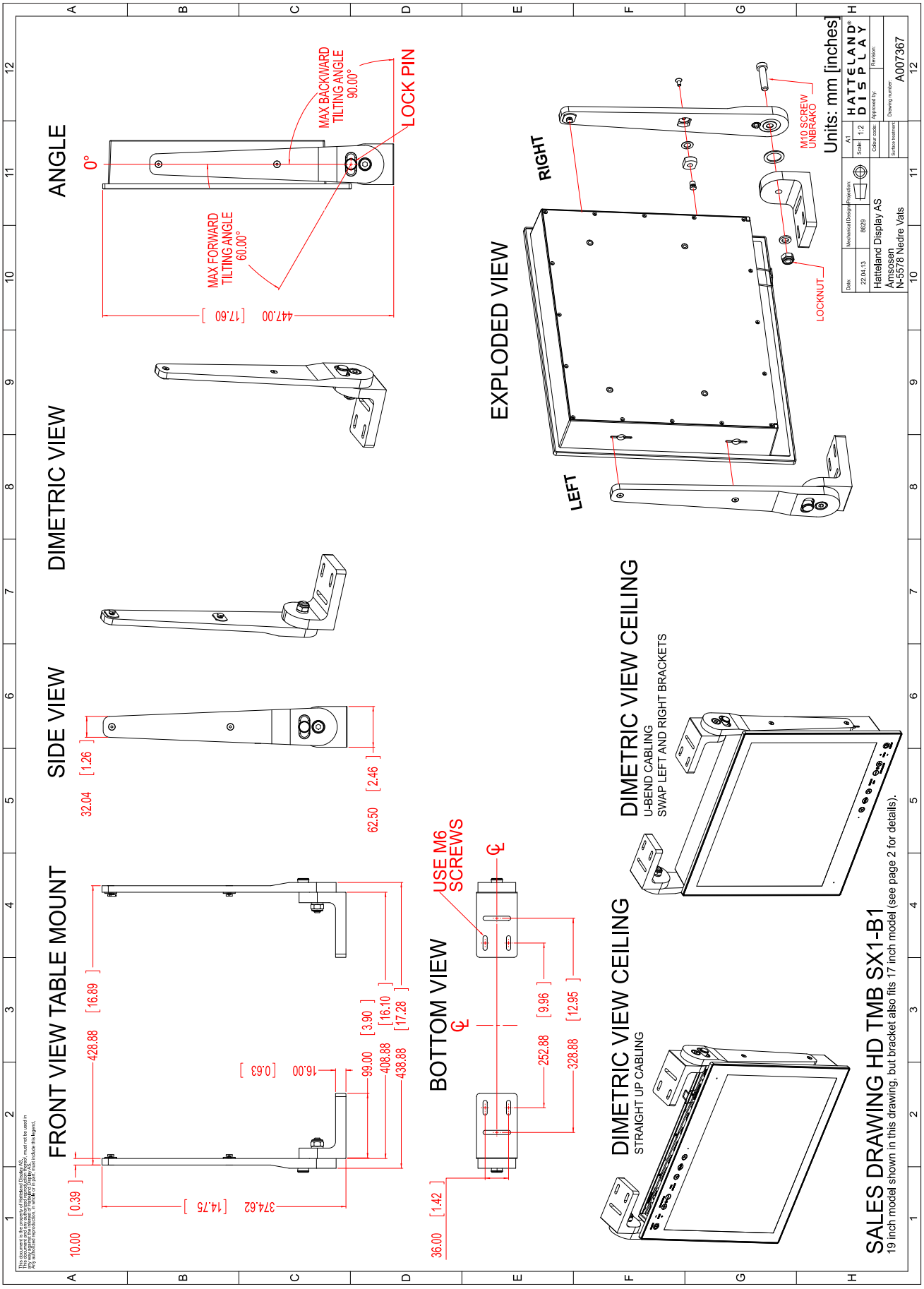

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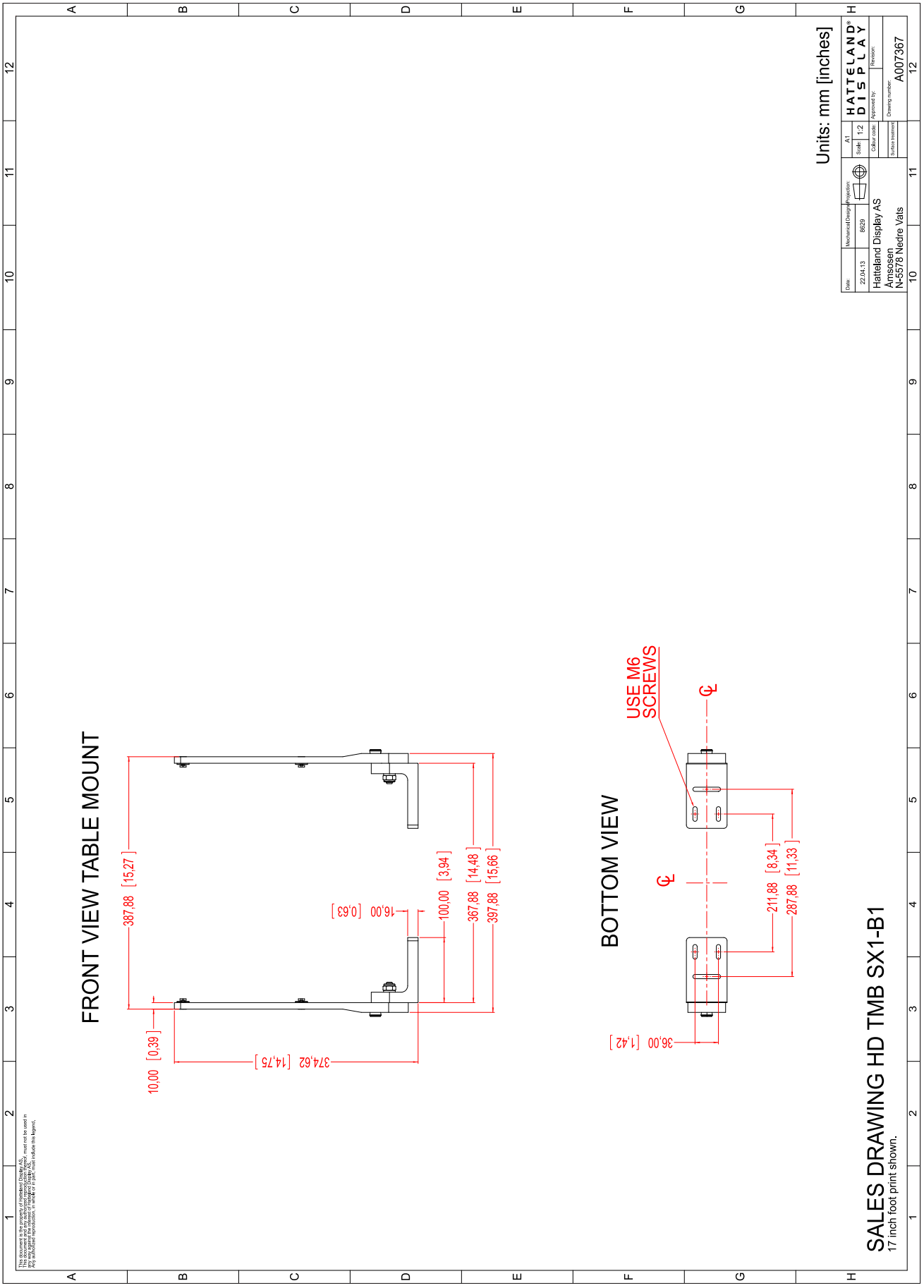

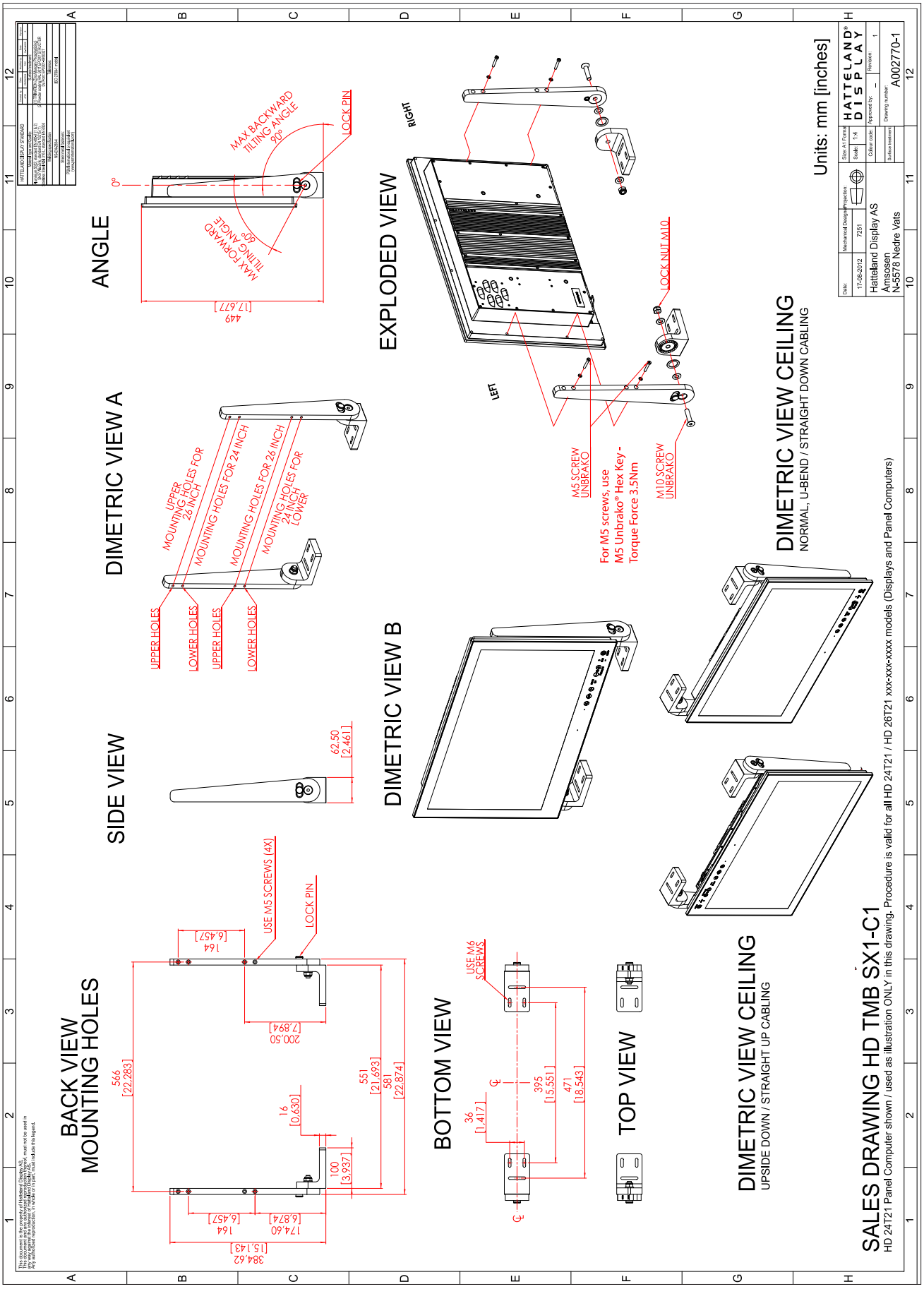

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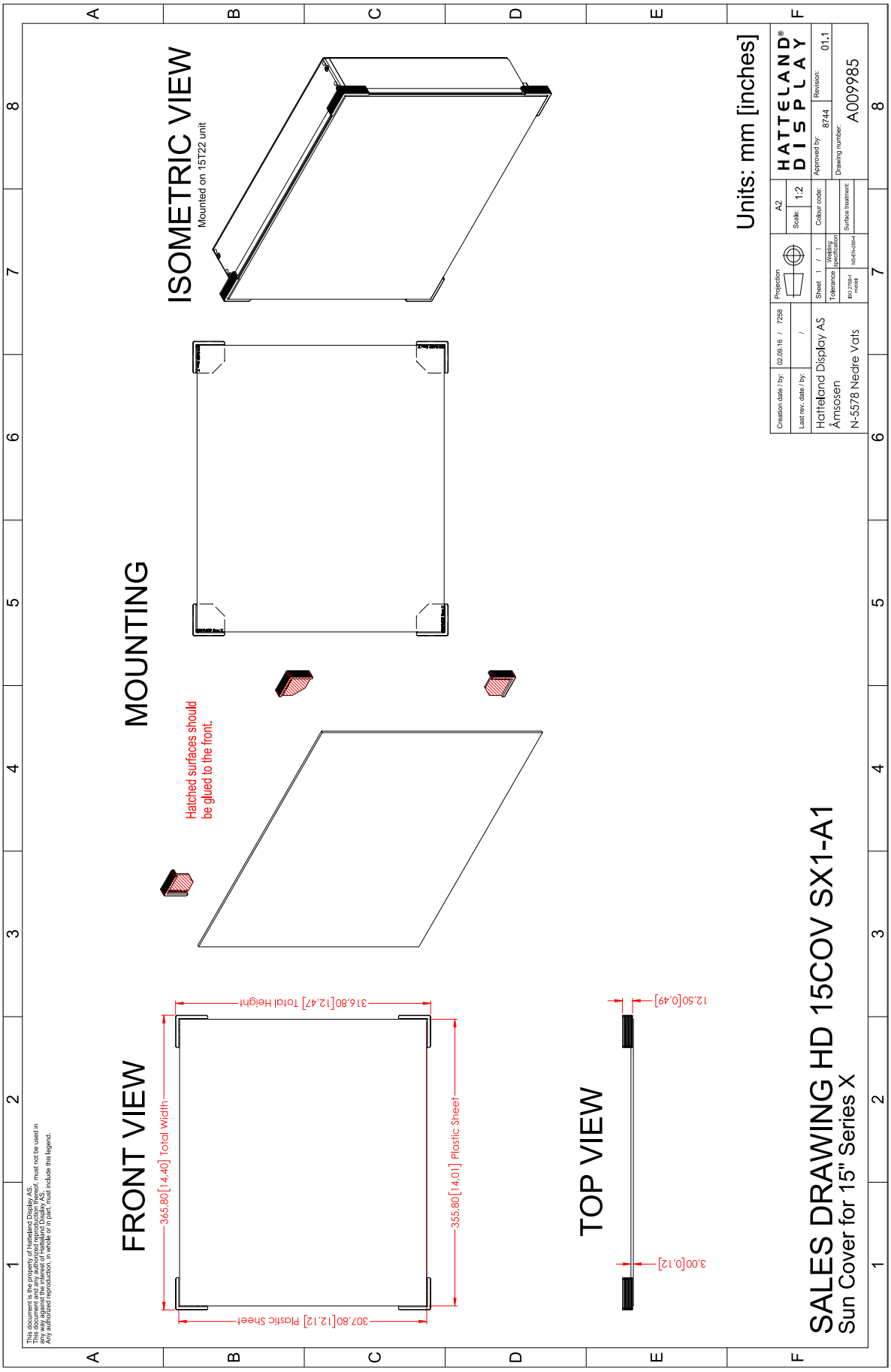

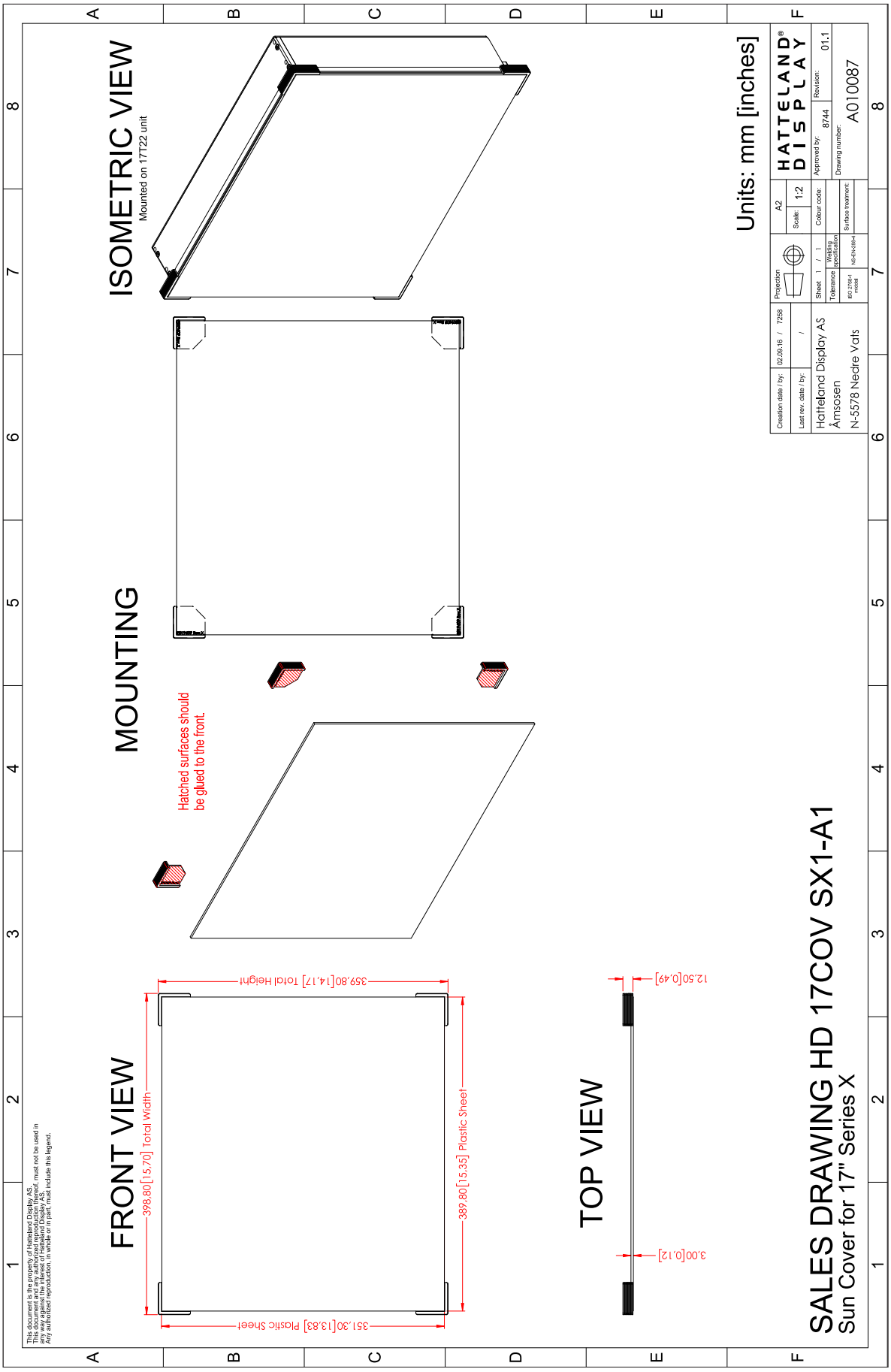

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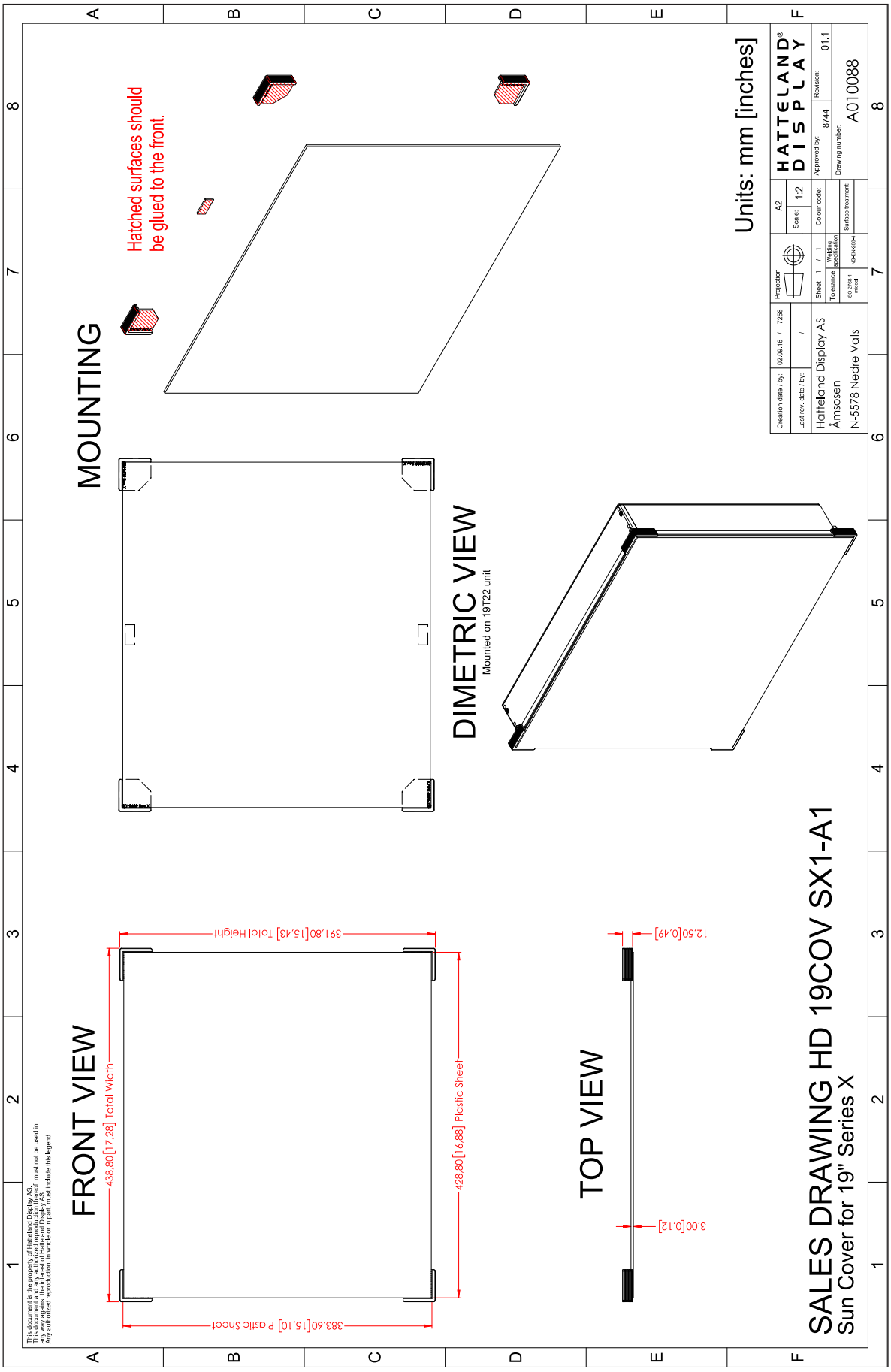

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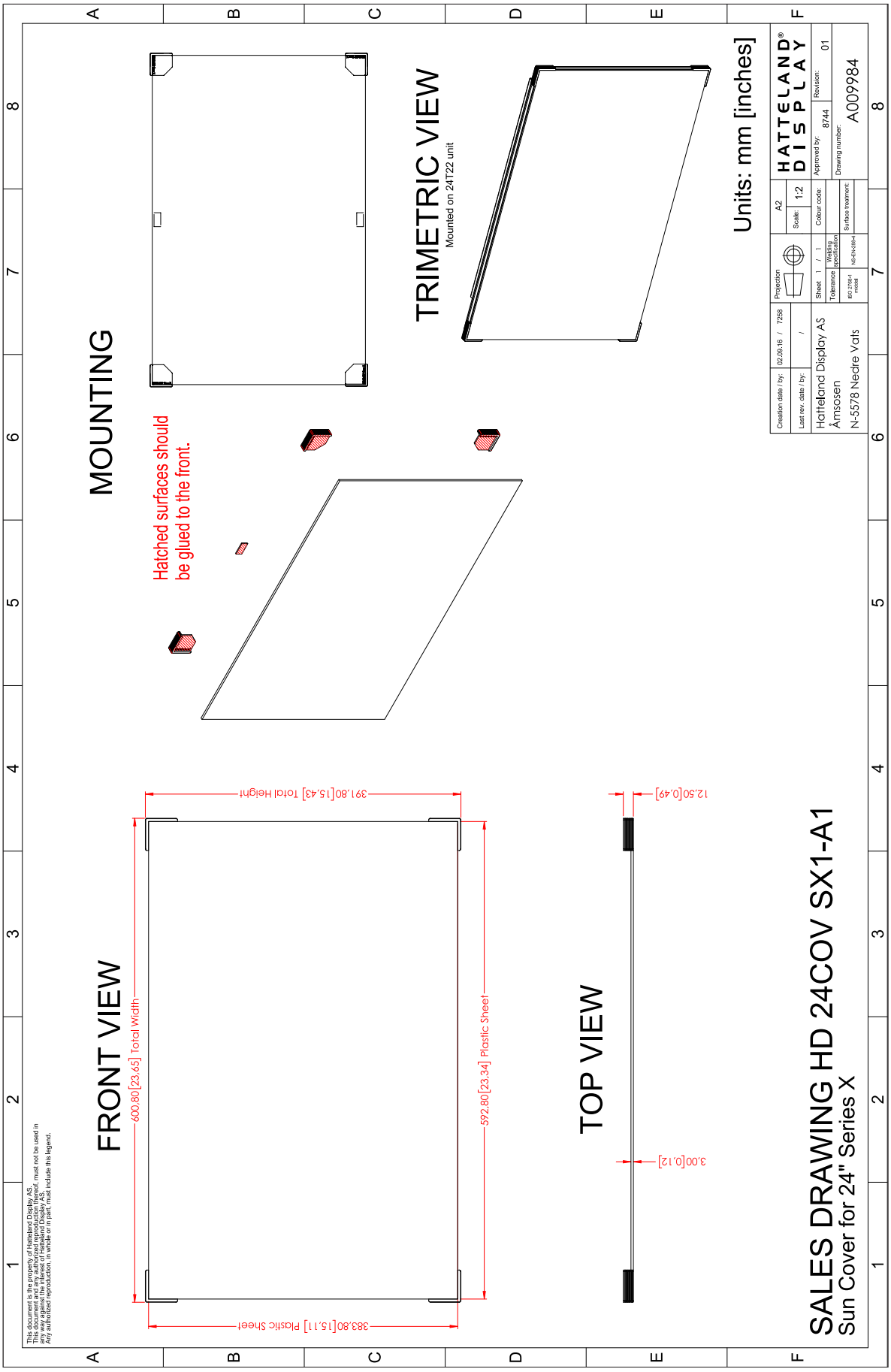

Dimensions might be shown with or without decimals and indicated as mm [inches]. Tolerance on drawings is +/- 1mm. For accurate measurements, check relevant DWG file.

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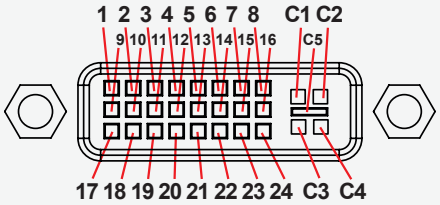
Appendixes

Pinout Assignments

Connectors illustrated here are either standard by factory default or may be available (through factory customization). Note that some combinations may not be possible due to space restrictions. List also valid for customized models. All pin out assignments are seen from users Point of View (POV) while looking straight at the connector. Please review the dedicated datasheet or technical drawings for your actual unit to identify and determine the presence of desired connector. Detailed information about Housing Connectors (terminal blocks) can be found earlier in this manual.

18/24/24+5 pin DVI-D, DVI-I, Single Link, Dual Link Combined Female

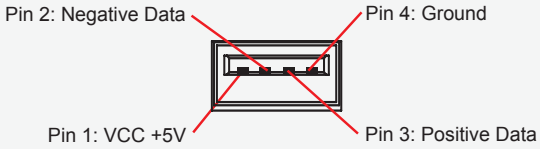


PIN 01	T.M.D.S. Data2 - (Digital - RED link 1)
PIN 02	T.M.D.S. Data2 + (Digital + RED link 1)
PIN 03	T.M.D.S. Data2/4 Shield
PIN 04	T.M.D.S. Data4 - (Digital - GREEN link 2)
PIN 05	T.M.D.S. Data4 + (Digital + GREEN link 2)
PIN 06	DDC Clock
PIN 07	DDC Data
PIN 08	Analog Vertical Sync (DVI-I only)
PIN 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)

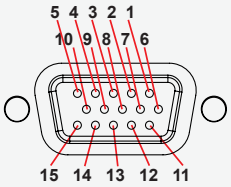
DDC = Display Data Channel.
T.M.D.S = Transition Minimized Differential Signal
PIN C1,C2,C3,C4 = Only present on DVI-I connectors.

NOTE: Connector shows a DUAL LINK design, but some units may not support it.
Only units with 1920x1200 or more in resolution require / support DUAL LINK.

4-pin USB TYPE A

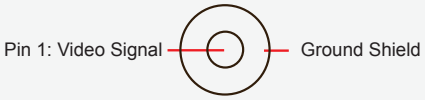


Analog RGB/VGA, 15-pin DSUB High Density Female

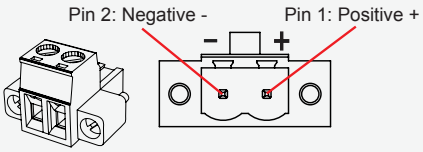


PIN 01	RED	Red, analog
PIN 02	GREEN	Green, analog
PIN 03	BLUE	Blue, analog
PIN 04	ID2/RES	Reserved for monitor ID bit 2 (grounded)
PIN 05	GND	Digital ground
PIN 06	RED_RTN	Analog ground red
PIN 07	GREEN_RTN	Analog ground green
PIN 08	BLUE_RTN	Analog ground blue
PIN 09	KEY/PWR	+5V power supply for DDC (optional)
PIN 10	GND	Digital ground
PIN 11	ID0/RES	Reserved for monitor ID bit 0 (grounded)
PIN 12	ID1/SDA	DDC serial data
PIN 13	HSYNC.	Horizontal sync or composite sync, input
PIN 14	VSYNC.	Vertical sync, input
PIN 15	ID3/SCL	DDC serial clock

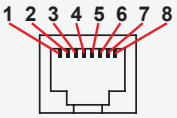
1-pin RCA/BNC COMP. VIDEO Female



2-pin DC Power Input,



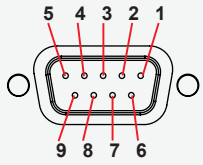
8-pin RJ45 10/100/1000Mbps LAN/Ethernet



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)

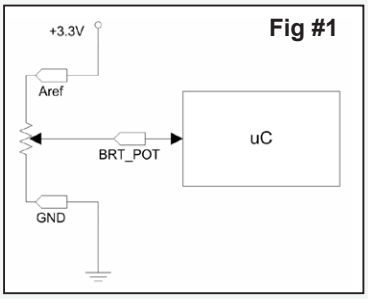
Pinout Assignments

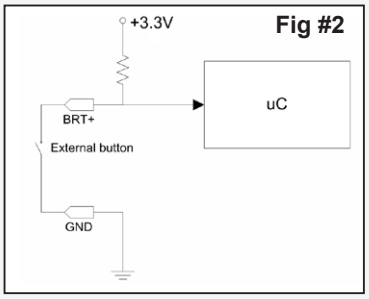
Potmeter Control, 9-pin DSUB Male



PIN 01	+5V	+5V out
PIN 02	Res.	Reserved, do not connect
PIN 03	Res.	Reserved, do not connect
PIN 04	Aref	For potensiometer
PIN 05	+12V	+12V out
PIN 06	BRT_POT	Potmeter in
PIN 07	BRT –	Button in
PIN 08	BRT+	Button in
PIN 09	GND	Ground

Potentiometer shall be **10kΩ LINEAR.** Connect like the illustrations shown below:

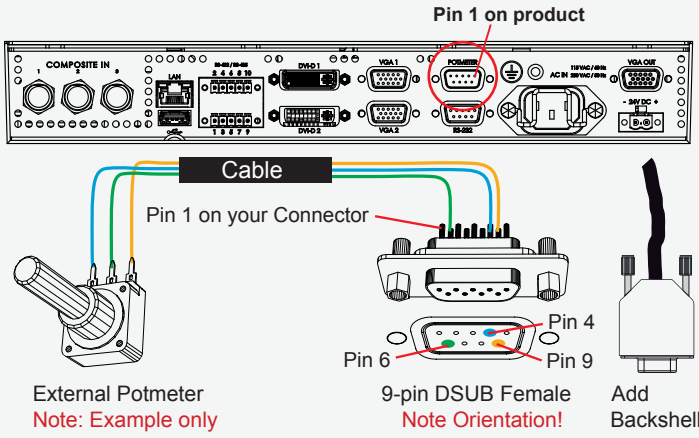




The BRT+ and BRT- can be used for controlling the brilliance by using external buttons. Example for the BRT+ input in figure #2:

Building your own cable:

Note: Requires soldering and assembly. It is expected that the technician has experience in electronics, soldering and assembling cables and connectors.



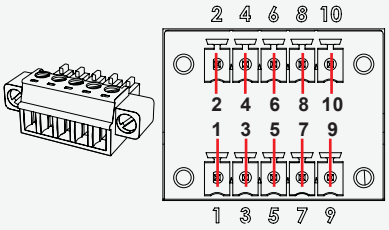
Use a cable that contains at least 3 wires (not 3 single wires). Heat Shrink Tubes must be applied to soldered wire/pins. Test connection (beep) with Voltage Meter. Test connection between power pin and other pins to ensure no short circuit is present prior to connecting cable and power on Display unit. Finally, the 9-pin DSUB must be covered by a back shell.

Note: External Potmeter Control is only available for the Maritime Multi Display (MMD) units. In order to activate the external potmeter-control, the internal *"FHA (Feature Header, Potentiometer)"* Serial Command has to be set first via our SCOM (Serial Communication Control Interface).

Usage for SCOM: Review the dedicated Technical Manual (INB100018-4) available from our website: http://www.hatteland-display.com/pdflink/inb100018-4.php

10-pin RS-422 / RS-485 Module

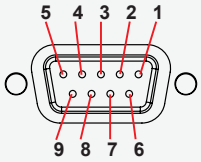
"RS-422/RS-485 SCOM + Ext. Buzzer"



PIN 01*	RxD+	Receive Data Positive
PIN 02	GND	Ground
PIN 03*	RxD-	Receive Data Negative
PIN 04	+5V	+5V Out
PIN 05*	TxD+	Transmit Data Positive
PIN 06**	BUZ-	Buzzer Control Negative
PIN 07*	TxD-	Transmit Data Negative
PIN 08**	BUZ+	Buzzer Control Positive
PIN 09	GNDR	Ground 100Ω
PIN 10	GND	Ground

*Pin 1,3,5,7 = RS-485 Full Duplex (4-wire)
*Pin 5,7 = RS-485 Half Duplex (2-wire)
**See notes in blue.

Serial COM RS-232 non-isolated, 9-pin DSUB Female



PIN 01**	BUZ+	Buzzer Control Positive*
PIN 02	TxD	Transmit Data
PIN 03	RxD	Receive 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**	BUZ-	Buzzer Control Negative*

*Wake On Ring is not enabled
**See notes in blue.

****Buzzer - External Drive Logic:**

- Able to supply 12VDC+-5%@100mA
- Short circuit protected at <500mA
- <50VDC from ground of Display unit (Our input is isolated, this is layout limitation)
- Our input is classified as signal input, not power.

Notes:

Unit may have several physical connectors available for Buzzer control. Please only use RS-232 or RS-485 pins to control Buzzer, not both at the same time.

Series X (G1 - Generation 1):

- External drive logic can drive the buzzer even when the Display Unit is off.

Series X (G2 - Generation 2) / MVD Series:

- Display Unit needs external power connected to turn buzzer on. (Any logic power state).

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 is set/adjusted to max brightness. 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 graphics driver installed in your system.

IMAGE APPEARANCE:
A faulty TFT panel can have black lines, pixel errors, failed sections, flickering or flashing image. Incorrect graphic 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 unit.

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,** Stokkastrandvegen 87B, N-5578 Nedre Vats, Norway

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

Low Voltage Directive 2006/95/EC
EN 60950:2006/A2:2013

EMC Directive 2004/108/EC
EN 55022:2010 / AC:2011 Class A
EN 55024:2010

Signature:.....
Frode Grindheim
Vice President Product Management
Nedre Vats, Norway

CE

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

CE MARK FIRST AFFIXED DATE (11 March 2010)

Declaration of Conformity

We, manufacturer, **Hatteland Display AS,** Stokkastrandvegen 87B, N-5578 Nedre Vats, Norway
declare under our sole responsibility that the JH MMD, JH MMC, JH STD, JH MIL, HM NMD, HM MIL, HM CMD, HT STD, HD MMD, HM MMD, HT MMC, HD MMC and HT/HM (computers) product ranges is in conformity with IEC 60945 4th (EN 60945:2002) and IACS E10 (where applicable)

HATTELAND®
DISPLAY

Declaration of Conformity

We, manufacturer, **Hatteland Display AS,** Stokkastrandvegen 87B, N-5578 Nedre Vats, Norway

declare under our sole responsibility that the products listed below comply with
FCC 47 CFR Part 15, Subpart B, Class A:

JH MMD, JH MMC, JH STD, JH MIL, HM NMD, HM MIL, HM CMD, HT STD, HD MMD, HM MMD, HT MMC, HD MMC and HT/HM (computers) product ranges

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Signature:.....
Frode Grindheim
Vice President Product Management
Nedre Vats, Norway

FC

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

FCC MARK FIRST AFFIXED DATE (16 February 2012)

This document was last approved, reviewed and found valid on **06 Jan 2015** by the signed participants as stated above.

HATTELAND® DISPLAY

IND100350-6 - Rev 02 - 26 May 2014

Description of environmental protection expiration dating

This seal is based on the official proclamations *"Contamination Protection Methods for Electronic Information Products"* and *"Requirements Related to Electronic Information Products T 11364-2006"* of 28th February 2006, which apply to electronic information products sold in China that use environmental protection expiration dating. Provided the related safety and usage precautions for this device are observed, there are no times during the length of the term from the date of manufacture where influence is exerted on environmental contamination, human body or property. When use of this product is terminated, please follow applicable local rules and regulations for collection recycling of electronic information products.

"China RoHS" Hazardous Substance Declaration

Type Number:	HD 26T21 MMD-MA4-FAGA						
Parts		**Electronics:**					
Description:	**Part Number:**	**Pb**	**Hg**	**Cd**	**Cr6**	**PBB**	**PBDE**
Mechanical parts, sheet metal	HD 26T21 MMD-MA4-FAGA-mechanical kit	O	O	O	O	O	O
Mechanical parts, die cast chassis	P006989	O	O	O	O	O	O
Protection glass w/logo	P006993	O	O	O	O	O	O
Electronic parts, circuit boards	HD 26T21 MMD-MA4-FAGA-circuit boards	X	O	O	O	O	O
Liquid Crystal Display, LCD	G260J1-L05	X	X	O	O	O	O
Power module 125w	L-SYS-0904-659-V1-1	O	O	O	O	O	O
Power module 60w	PBNO0918	O	O	O	O	O	O
GDC board	AADLN1R137	O	O	O	O	O	O
Buzzer	VSD100840	O	O	O	O	O	O
Internal cables - Kit	HD 26T21 MMD-MA4-FAGA	O	O	O	O	O	O
Labels	HD 26T21 MMD-MA4-FAGA-labels	O	O	O	O	O	O
Accessories	HD 26T21 MMD-MA4-FAGA-acc	O	O	O	O	O	O
Packing material	HAA184,HAA185,HAA186	O	O	O	O	O	O

O - Indicates that this hazardous substance contained in all homogeneous materials of this part is below the limit requirement in SJ/T 11363-2006.
X - Indicates that this hazardous substance contained in at least one of the homogeneous materials of this part is above the limit requirement in SJ/T 11363-2006.

Pb = Lead , Hg = Mercury, Cd = Cadmium, Cr = Hexavalent Chromium (Cr-VI)
PBB = Polybrominated biphenyl, PBDE = Polybrominated diphenyl ether.

Date: 26-May-2014

Thor Østrem HATTELAND® DISPLAY
Signature

Hatteland Display AS, Åmsosen, N-5578 Nedre Vats, Norway
Tel: (+47) 4814 2200 - mail@hatteland-display.com - www.hatteland-display.com

Return Of Goods Information

Return of goods:

(Applies not to warranty/normal service/repair of products)

Hatteland Display referenced as “manufacturer” in this document.

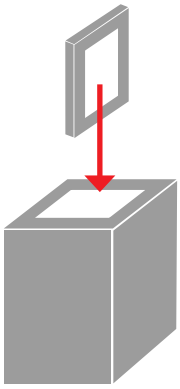
Before returning goods, please contact your system supplier before sending anything directly to manufacturer. When you return products after loan, test, evaulation or products subject for credit, you must ensure that all accessories received from our warehouse is returned. This applies to cables, powermodules 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 or review the following links at bottom of page for more information online.

Handling and packing units for return/credit

To prevent damage during shipping and transportation, respect the guidelines below.

Make sure you surround the product with the following material (whenever possible):



Use the original packaging from manufacturer, firm foam material, bubble wrap, lots of PadPack paper or foam chips/polyester wrapped in sealed plastic bags. Please make sure that the unit is protected with a surrounding plastic bag to prevent dust accumulation around the unit.

If you do not have the original packaging or are uncertain how to secure the unit properly, please consider seeking advice from nearby shipping or transportation offices, if in doubt!

Do not under any circumstances use loose foam chips, expanded polyester, clothes, cardboard with sharp edges/spikes, too little or nothing to secure the unit inside the box. Do not use cardboard boxes that are clearly too weak or not suitable for securing the unit properly during overseas shipment.

Reference Links:

http://lcm.hatteland-display.com/CustomerRMA/CustomerRMA.aspx
http://www.hatteland-display.com/rma_procedure.php
http://www.hatteland-display.com/terms

General Terms and Conditions

As of January 2015, Hatteland Display AS' *"Terms of Sales and Delivery"* and *"Warranty Terms"* has been substituted by the updated *"General terms and conditions for sale of goods and performance of additional services"* (the "General Terms and Conditions").

Further, from January 2015 onward, the previous *"Terms of Sales and Delivery"* and *"Warranty Terms"*, as well as other standard terms and conditions, policies and instructions issued by Hatteland Display AS, will be removed from the User Manuals.

Instead, the updated General Terms and Conditions and the other standard terms and conditions, policies and instructions issued by Hatteland Display AS will be available via our website only.

Please visit http://www.hatteland-display.com/terms to review the latest revision of this documentation.

Long Term Storage Recommendations

For Minimum storage life for Hatteland Display products, Storage Conditions, Periodic maintenance - test procedure, please visit: http://www.hatteland-display.com/pdf/misc/ind100350-5_long_term_storage_recommendations.pdf

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.

Last Revised July 2007

Notes

General Notes:

- The unit is type approved according to EN60945 4th, 4.4, equipment category b) protected from the weather.

- Other type approvals applies for the different products.
  Please see the appropriate “Specifications” page in this manual for more information.

- Use of brillance and Glass Display Control™ (touch key functions) may inhibit visibility of information at night.

Note for units equipped with an PCTS (Projected Capacitive) Touch Screen:

Reference to Engineering Change Notification June 2013: http://www.hatteland-display.com/mails/10_2013_ecn.html

Touch Screen Firmware V1001 (12 inch) and V1000 (15,17,19,24):
For Maritime Multi Display (MMD) / Industrial Standard Display (STD) units the touch screen signals are routed through the display unit via the USB port and can not be controlled / detect status by the unit itself in any way. It means that even if the unit was turned off by the front bezel Power ON/OFF function, the touch screen is still active and it will still send touch screen signals through the pipeline.

This can be an issue to consider when you are cleaning the front glass. In order to avoid sending touch screen signals, you have to either physically cut power to the unit, making sure that no lights illuminate, or disconnect the USB cable physically from either computer or display unit. You may also disable the touch screen functionality from within the Operating System (OS) or via customized functions from within applications running on the external computer you have connected.

Touch Screen Firmware V1002 (12 inch) and V1001 (15,17,19,24,26):
Issue described above has been solved. For Maritime Multi Display (MMD) / Industrial Standard Display (STD) units regarding cleaning of front glass, you have to be aware that in order to avoid sending touch screen signals to a connected computer, you have to turn off the Display unit (via its front Power Symbol) and clean the front glass. When done cleaning, simply turn on the Display again and Touch Screen controller is automatically re-activated.

To learn more about how to properly clean glass surfaces, review the “Ergonomics” section in the “General Installation Recommendations” chapter earlier in this manual.

User Notes

Revision History

Rev.	By	Date	Notes
00-1	BU SE	15 Feb 2012	Release for internal review.
01	ALL BU SE	17 Mar 2012	Revised after internal review.
02	AB SE	20 Apr 2012	Revised Console Mount Kit+Table Mount Bracket typenumbers (page 6,16,17,52,53,54,55,56,57,68,69,70,71) Replace MMC drawing with MMD/STD drawing (page 69,70)
03	BU AK SE	16 Aug 2012	Added text for MADI, DCDi functions, page 35,36 Revised type approvals, page 54,55,56,57,58,59
04	AB BU SE	13 Nov 2012	Revised minor text elements throughout manual where needed Revised Contents of Package (Console Mounting kit now part of standard factory delivery), page 5 Added note about Full/Half duplex, page 79
05	BU SE	10 Jan 2013	Added point 1. to Ergonomics section, cleaning of glass, page 12 Added Installation procedures for HD TMB SX1-C1 and HD 19BRD SX1-A1, page 18,19,20 Added new functions: “OSD Lock mode/Full Mode” and “OSD Key Outdoor”, page 32,45,46,47 - Reference to ECN: http://www.hatteland-display.com/mails/01_2013_ecn.html Revised text for “OSD Mode/Full”, note #2, concerning power off and on, reverts back to Simplified, page 46 Revised text for “LED Drive”, default is 0-31, not 0-100, page 51 Revised text for “GDC Sensitivty”, added caution how to reset this value via SCOM command, page 51 Added Mounting Bracket (BRD version 1) accessory typenumber for 12,15,17 inch, page 58,59,60 Added High Bright specifications for 17 and 19 inch, page 60,61 Added note for PCTS (Projected Capacitive) Touch Screen, page 90
06	AB MM SE	18 Jun 2013	Revised Contents of Package (connectors), page 6 Revised Product Labeling chapter, ref: QAR/117540, page 10,11,12,13 Added General Touch Screen Info and labels page 10,11,12,13,14,15 Added section “Installation limitations”, page 19 Revised point 7 in General mounting instructions, grounding, page 20 Added Housing Connector overview, page 23,24 Added specifications and drawings for 26 inch Cap. Touch Screen model, page 71,80 - Reference to: http://www.hatteland-display.com/mails/06_2013_ecn.html Added accessory HD VED SX1-A1 VESA Bracket drawing, page 86 Revised note for PCTS (Projected Capacitive) Touch Screen, page 99 - Reference to http://www.hatteland-display.com/mails/10_2013_ecn.html
07	GOS SE	03 Jul 2013	Revised Mounting Brackets, Keyhole, Left/Right, BRD and TMB versions, page 27,28,29,30,31,32,33
08	FG SE	30 Sep 2013	Revised typenumber for DC Power In Connector (1805301 to correct 1961986), page 6,23
09	LS SE	12 Nov 2013	Revised Viewing Distances (ECDIS), page 19 Revised Housing Connector overview, page 23,24 Revised “Mounting Bracket, Table / Desktop / Ceiling - 12”,15”,17”,19” chapter, page 28,29,30,31,32,33,34 Revised User Controls illustration and descriptions, page 40,41 Added Datasheet and Sales Drawings for revised High Bright models (17,19,24), page 75,77,79,88,90,92 - Reference to http://www.hatteland-display.com/mails/33_2013_ecn.html Added missing 12 inch Technical Drawings AC and DC models, page 84,85 Replaced Single Keyhole drawings with updated Double+Single Keyhole (15,17,19 inch), page 86,87,89 Revised Technical Drawings for 24 and 26 inch, page 91,93,94
10	LS SE	16 Dec 2013	Revised ”Housing / Terminal Block Connector Overview” chapter, added screwdriver details, page 23 Added drawings for Console Mount Kit 12,15,17,19 footprint indication, page 98,99
11	FG BB LS GOS VM SE	27 May 2014	Revised Mounting Bracket, Table / Desktop / Ceiling - 12”,15”,17”,19” chapter, page 30-36 Minor text adjustment, page 61 (ref: QAR/123560) Minor text adjustment, page 48 (ref: QAR/123578) Revised Sales Drawing HD CMB SX1-A1, page 98 Revised Sales Drawing HD VED SX1-A1, page 106 Added Sales Drawing for HD TMB SX1-A1 (12/15 inch), page 107,108 Added Sales Drawing for HD TMB SX1-B1 (17/19 inch), page 109,110 Added Sales Drawing for HD TMB SX1-C1 (24/26 inch), page 111 Added Environmental Protection Expiration Dating sheet for HD 26T21 MMD-MA4-FAGA, page 121
12	FG SE	05 Aug 2014	General revision throughout the manual regarding minor text changes Revised contents of package and specifications, mention High Bright models includes gasket, page 5
13	BB KK SE	28 Nov 2014	Added HD CMB SX1-A3 accessory, page 103 Added JH 15TAP STD-C1 and JH 19TAP STD-C1 accessories, page 108,109 General update throughout the manual.

Appendix 144

Revision History

14	KK FG SE	09 Dec 2014	Added drawings for HD CMB SX1-C1 accessory, page 30,109,110,111 Added Multitouch option, now available for 26 inch models, page 84
15	PG VM MS SE	09 Feb 2015	General maintenance update regarding minor text changes throughout the manual. Revised note/text for HD CMB SX1-A1 and -A2, page 7 Revised brackets overview, page 31,32 Added drawing for JH 26TAP STD-A1, Series X to Series 1 frame adapter, page 115 Added note for external Potmeter Control function, ref: QAR/126392, page 123 Revised ”Return of goods information”, page 127 Revised ”General Terms and Conditions”, page 128
16	MJL SE	31 Mar 2015	Revised Grounding, General Mounting Instructions chapter, point 7, ref: QAR/128155, page 22
17	MJL SE	09 Apr 2015	Revised Grounding Screw text, page 42
18	GM FG SE	26 Aug 2015	Revised ”Touch Screen Drivers” chapter, page 17
19	FG AK SE	06 Nov 2015	General update throughout the manual Revised Touch Screen Introduction, text and tables, page 16 Revised HD TMB SX1-C1, Max Forward Tilting angle (from 62° to 60°), page 120
20	VM SE	28 Jan 2016	Revised ”OSD Key Outdoor” text, and general updated throughout manual, ref: QAR/131995, page 21 Changed DSUB 9P MALE to FEMALE for ”RS-232 COM I/O” text, page 41
21	VM MJL ØS SE	15 Mar 2016	Revised External Potmeter Diagram in ”Pinout Assignments” chapter, page 123 Ref: QAR/131968
22	VM SE	25 May 2016	Revised ” Image Settings - Auto Color Balance” text, page 54
23	JE VM SE	01 Jun 2016	General update throughout the manual, ref: http://www.hatteland-display.com/mails/06_2016_ecn.html
24	JE ML SE	21 Dec 2016	Added details for buzzer pins, page 123 General update throughout the manual.
25	FG WJ SE	01 Feb 2017	Added ”Operation Advanced (DDC/CI) control” chapter, effective from models with GEV video controller firmware GEVHD_160913 (February 2017) and higher, page 75,76,77 Added Accessory, HD 19TAP SX1-C2 (19inch Series X to 19inch Series 2 Console Cutout), page 119,120 Added Accessory, HD 15/17/19/24COV SX1-A1 (UV Sun Covers), page 127,128,129,130
26	JE WJ BB SE	08 Feb 2017	Revised DDC/CI chapter with updated date and reference to ECN, page 76
27	FG BB SE	26 May 2017	Changed error in ”GEVHD_160913”, should be ”160914”, page 76
28	KKK AK FG SE	17 Aug 2017	Added Mounting Instructions, JH 19TAP SX1-C2, page 121