Operations Manual

WP4000 Series Web HMI
HTML5 Client with Built-in Chromium Browser

Your Industrial Control Solutions Source

www.maplesystems.com

For use with the following:

- WP4000A Series Web HMI
- WP4000AP Series Web HMI

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COPYRIGHT NOTICE

WARRANTY

Warranty Statements are included with each unit at the time of purchase and are available at www.maplesystems.com.

TECHNICAL SUPPORT

This manual is designed to provide the necessary information for trouble-free installation and operation of your Monitor. However, if you need assistance, please contact Maple Systems:

- Phone: 425-745-3229
- Email: support@maplesystems.com
- Web: www.maplesystems.com

UNPACKING THE UNIT

Carefully unpack the Web HMI. Check all material in the container against the packing list. Maple Systems will not accept responsibility for shortages against the packing list unless notified within 30 days. The equipment and accessories were inspected and tested by Maple Systems before shipment.

Examine the equipment carefully; if any shipping damage is evident, notify the carrier immediately. Maple Systems is not responsible for claim negotiations with the carrier.

Save the shipping container and packing material in case the equipment needs to be stored, returned to Maple Systems, or transported for any reason.

Packing List
WP4000 Web HMI
DC Power Connector (3-pin Terminal Block)
Screen Protector
Panel cutout guide
Panel Mounting Clamps (2, 4, or 6 – depending on display size)

SAFETY PRECAUTIONS

Please observe the following precautions when installing the WP4000 Series. Failure to comply with these restrictions could result in loss of life, serious personal injury, or equipment damage.

	**Warning: Explosion Hazard** • Do not disconnect equipment unless power has been removed or the area is known to be non-hazardous. • Substitution of any component may impair suitability for Class I, Division 2. • Secure any external connections that are made to this equipment by using screws, sliding latches, threaded connectors or any other means provided with this product. • If this product contains batteries, they must only be changed in an area known to be nonhazardous.
	**Warning:** Do not use this product for emergency stop. A separate physical switch, outside the product, must be used for any emergency stop operations.
	**Warning:** Before applying power to the unit make sure the voltage of the power source is within the input voltage rating of the unit.
	**Warning:** Do not attempt to open, dismantle or modify the product; doing so will void the warranty.
	**Warning:** This product is supplied as open-type equipment, and it must be mounted within an enclosure suitably designed for specific environmental conditions.
	**Warning:** When used in Class I, Division 2 hazardous locations, the product must be mounted in a suitable enclosure with proper wiring method that complies with all governing electrical codes.
	**Warning**: Do not connect or disconnect the USB cable with power applied to this product or any other device on USB network as an electrical arc can occur, which could cause explosion in hazardous location installations.
	**Warning:** If any of the following situations arise, get the equipment checked by qualified service personnel. • The power cord or plug is damaged. • Liquid has penetrated the equipment. • The equipment has been exposed to moisture. • The equipment does not work well, or you cannot get it to work according to this manual. • The equipment has been dropped and damaged. • The equipment has obvious signs of breakage.
	**Warning:** Do not place the product in direct sunlight. Prolonged exposure to sunlight may degrade the LCD and housing.
	**Warning:** Do not leave this equipment in an uncontrolled environment where the storage temperature is below -20°C (-4°F) or above 85°C (185°F). It may damage the equipment.

PRODUCT OVERVIEW

Web HMI Hardware

The WP4000 Series Web HMI is a series of HTML5 Powered Client Devices with a built-in Chromium browser connecting to a remote server. There are three options for display size, 4.3 inches, 7 inches and 10.1 inches with either an Analog Resistive Touch Screen (WP4043A, WP4070A, WP4101A) or a Projected Capacitive Touch Screen (WP4043AP, WP4070AP, WP4101AP).

4.3” Display units feature a 480 x 272 pixel resolution, 7” display units are equipped with either an 800 x 480 pixel (WP4070A) or 1024 x 600 (WP4070AP) resolution, and 10.1” display units have 1024 x 600 pixel resolution.

All WP4000 Web HMI Series devices are compliant with EMC directive 2014/30/EU and LVD directive 2014/35/EU and certified for UL Class I Div. 2. These certifications enable the WP4000 Series Web HMI units to operate in hazardous locations such as those found within the oil and gas, mining and chemical manufacturing industries. Additionally, the WP4000 Series’ IP66 compliant front panel allows for use in washdown environments.

Web HMI Software

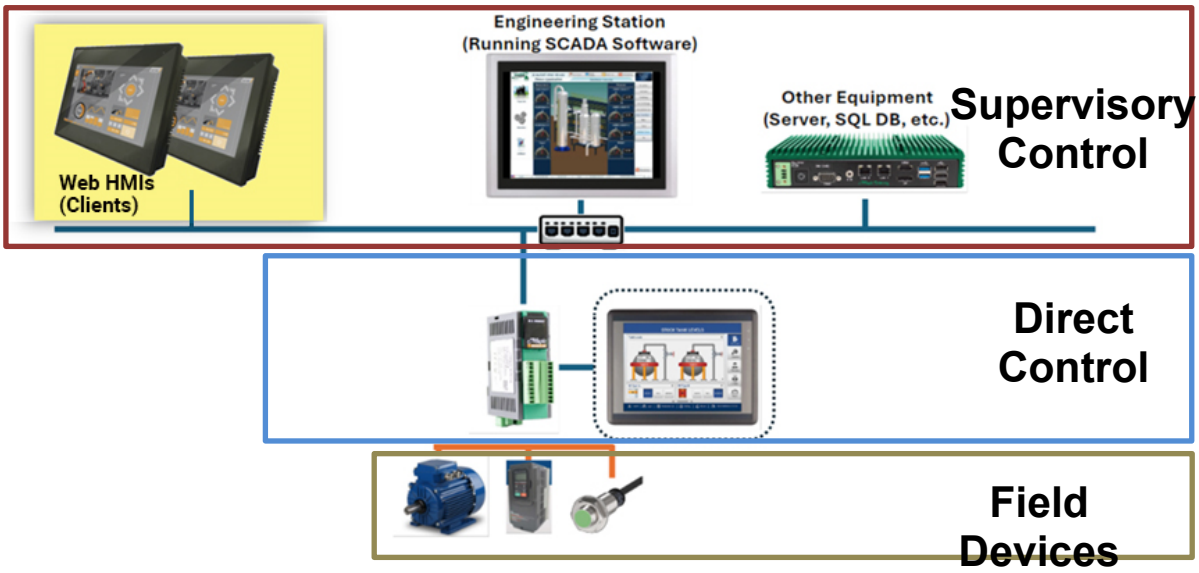
The WP4000 Series Web HMI operates via a lightweight Linux™ based operating system whose main function is to start and display a Web Browser (Chromium). There is no project to upload or download to the Web HMI; all the interactions between the user and the equipment being monitored reside in the destination web server the WP4000 Series connects to.

Web Browsers are increasingly popular application platforms for several reasons. Web Browsers run Web Apps that are facilitated by a central Web Server. The browser is a client running a Web App, served by a Web Server. Web Browsers themselves are not CPU intensive, offer portability and function on a wide array of devices, and can be run on low-cost browser-only devices like the Web HMI to provide key functionality on the network.

Many of today’s Industrial Automation products natively support web browser interfaces; SCADA systems such as CODESYS® or Inductive Automation’s *Ignition*™, Control devices like PLCs and HMIs (such as Maple Systems’ cMT series) offer browser interfaces such as *EasyWeb*, and Industrial PCs such as Maple Systems’ IPC lineup can be operated with a web interface by utilizing protocols such as VNC or myriad “soft PLC” programs compatible with Microsoft Windows® or Linux® Operating Systems.

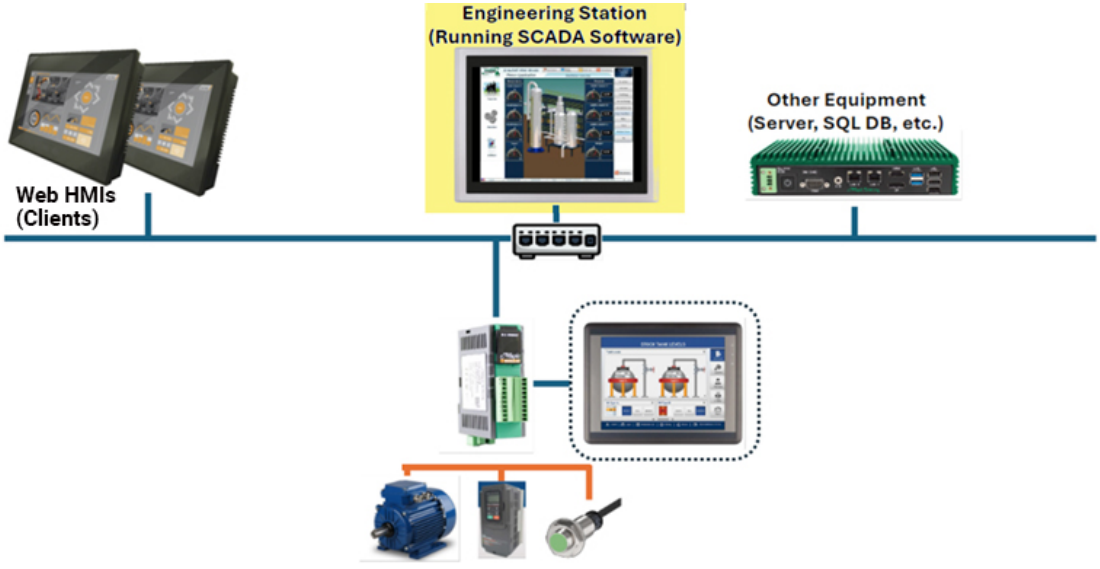
Web HMI Systems Integration

There are many ways to utilize Maple Systems' Web HMI units into a network. One of the ways is for the Web HMI to fit into the system's Ethernet network as an additional client device, supplementing other existing monitoring devices. This is akin to how an HMI interacts with a PLC to monitor values and allow user input. Two other common methods are illustrated below.



In this Automation setup, the Web HMI fits into the Supervisory Control layer; its function is to provide additional terminals from which users can access or monitor the system, without requiring the stations to be equipped with expensive and needlessly complex computing power.

The Web HMI series has the unique ability to fit into a similar level within a SCADA control system as more powerful PC devices at a fraction of the cost, while maintaining connectivity with a wide array of controlled devices.



In this example, an Industrial PC may be responsible for running AVEVA Edge or another SCADA system to oversee control devices. A Web HMI acts as the perfect addition to the system for users to install another physical interface terminal. SCADA workstations running web-based SCADA software programs can be natively connected to by Web HMIs.

SPECIFICATIONS

WP4XXXA Models

System	**CPU**	Dual ARM Cortex-A9, up to 1GHz with GPU 2D/3D support		
	Memory (eMMC)	4 GB		
	Memory (RAM)	1 GB		
Touch Screen	**Type**	4-wire Resistive Touch		
I/O Ports	**LAN**	1 x 10/100 Mbps RJ45		
	CANbus	N/A		
	USB Host	1 x USB 2.0 (Type A)		
	USB Client	1 x USB 2.0 (Type C)		
	Serial	N/A		
Display	**Display Type**	**4.3" WQVGA TFT**	**7" WVGA TFT**	**10.1" WSVGA TFT**
	Size (W x H)	3.70" x 2.1" [95 x 54 mm]	5.98" x 3.58" [152 x 91 mm]	8.74" x 5.24" [222 x 133 mm]
	Max. Resolution	480 x 272	800 x 480	1024 x 600
	Max. Colors	16M		
	Luminance (cd/m^2)	400	350	350
	Backlight Lifetime (Hours)	30,000+	30,000+	50,000+
Electrical	**Input Voltage**	24 VDC (±15%)		
	Input Current	220 mA @ 24 VDC	300 mA @ 24 VDC	350 mA @ 24 VDC
	Input Power	5.28 W	7.20 W	8.40 W
Mechanical	**Dimensions (W x H x D)**	4.72" x 3.50" x 1.24" [120 x 89 x 31.5 mm]	7.32" x 5.43" x 1.22" [186 x 138 x 31 mm]	10.55 x 7.48 x 1.30" [268 x 190 x 33 mm]
	Panel Cutout (W x H)	4.37" x 3.15" [111 x 80 mm]	6.89" x 5.00" [175 x 127 mm]	10.08" x 7.01" [256 x 178 mm]
	Net Weight	Approx. 0.44 lbs (0.2 kg)	Approx. 0.88 lbs (0.4 kg)	Approx. 1.98 lbs (0.9 kg)
	Enclosure	Plastic, Black		
	Mounting	Panel		
Environmental	**Operating Temperature**	32 ~ 122° F (0~50° C)		
	Storage Temperature	-4 ~ 185° F (-20 ~ 85° C)		
	Relative Humidity	10 ~ 95% (non-condensing)		
	Shock Resistance	25g, 11ms, 6 shocks per axis, total 18 shocks (X, Y, Z) per IEC 60068-2-27		
	Vibration Endurance	5~150Hz, 3g peak, (X, Y, Z)		
	Rating	IP66 compliant front panel		
	Certifications	cULus (Class I, Div 2), CE, RoHS		
Software	**Operating System**	Linux Yocto		
	Browser	Chromium Based Browser Version 75		
Notes	* Specifications subject to change without notice.			

WP4XXXAP Models

System	**CPU**	Dual ARM Cortex-A9, up to 1GHz with GPU 2D/3D support		
	Memory (eMMC)	4 GB		
	Memory (RAM)	1 GB		
Touch Screen	**Type**	Capacitive Touch		
I/O Ports	**LAN**	1 x 10/100 Mbps RJ45		
	CANbus	N/A		
	USB Host	1 x USB 2.0 (Type A)		
	USB Client	1 x USB 2.0 (Type C)		
	Serial	N/A		
Display	**Display Type**	**4.3" WQVGA TFT**	**7" WSVGA TFT**	**10.1" WSVGA TFT**
	Size (W x H)	3.70" x 2.1" [95 x 54 mm]	5.98" x 3.58" [152 x 91 mm]	8.74" x 5.24" [222 x 133 mm]
	Max. Resolution	480 x 272	1024 x 600	1024 x 600
	Max. Colors	16M		
	Luminance (cd/m^2)	1000		760
	Backlight Lifetime (Hours)	30,000+	30,000+	50,000+
Electrical	**Input Voltage**	24 VDC (±15%)		
	Input Current	220 mA @ 24 VDC	300 mA @ 24 VDC	350 mA @ 24 VDC
	Input Power	5.28 W	7.20 W	8.40 W
Mechanical	**Dimensions (W x H x D)**	4.72" x 3.50" x 1.24" [120 x 89 x 31.5 mm]	7.32" x 5.43" x 1.22" [186 x 138 x 31 mm]	10.55 x 7.48 x 1.30" [268 x 190 x 33 mm]
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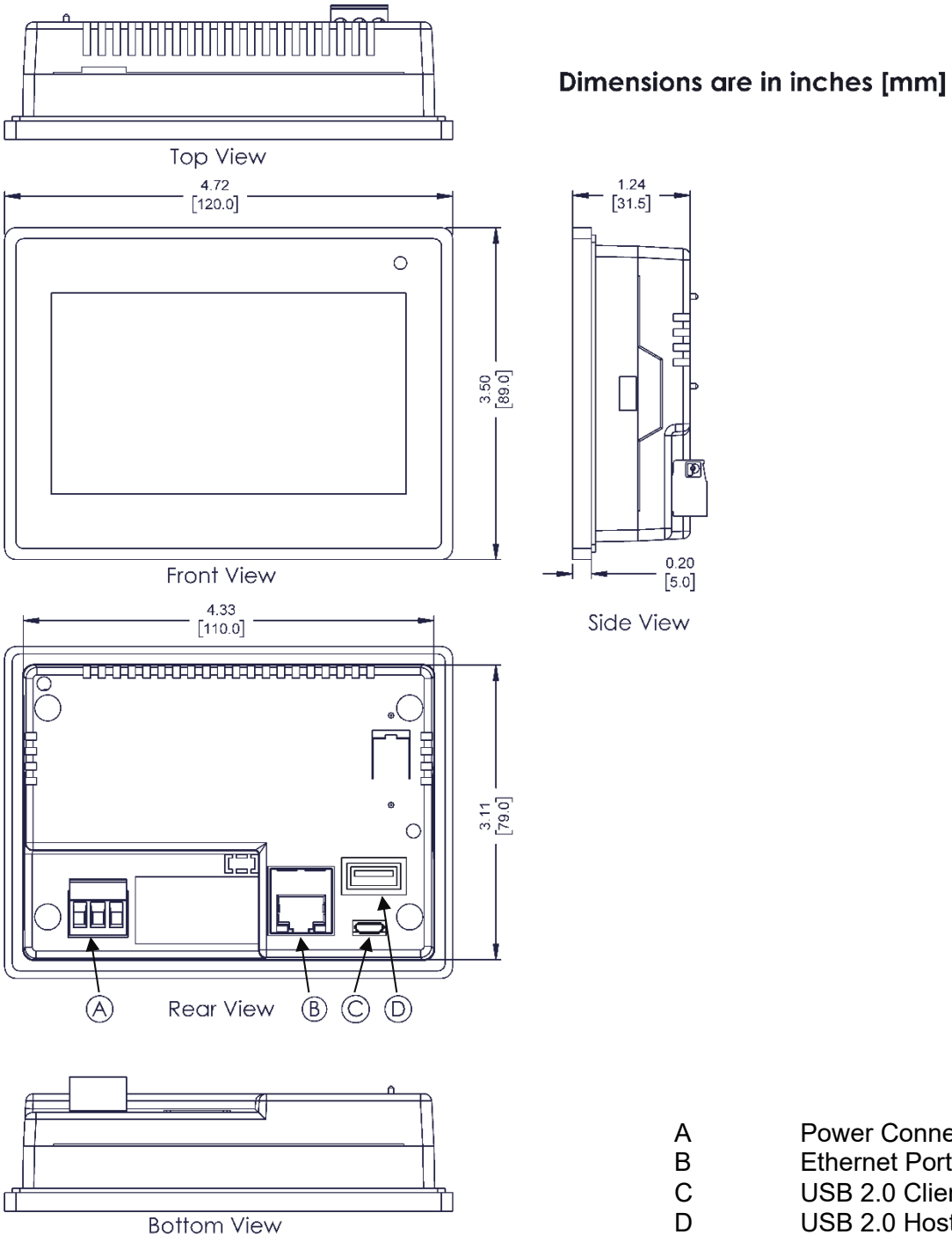
	Rating	IP66 compliant front panel		
	Certifications	cULus (Class I, Div 2), CE, RoHS		
Software	**Operating System**	Linux Yocto		
	Browser	Chromium Based Browser Version 75		
Notes	* Specifications subject to change without notice.			

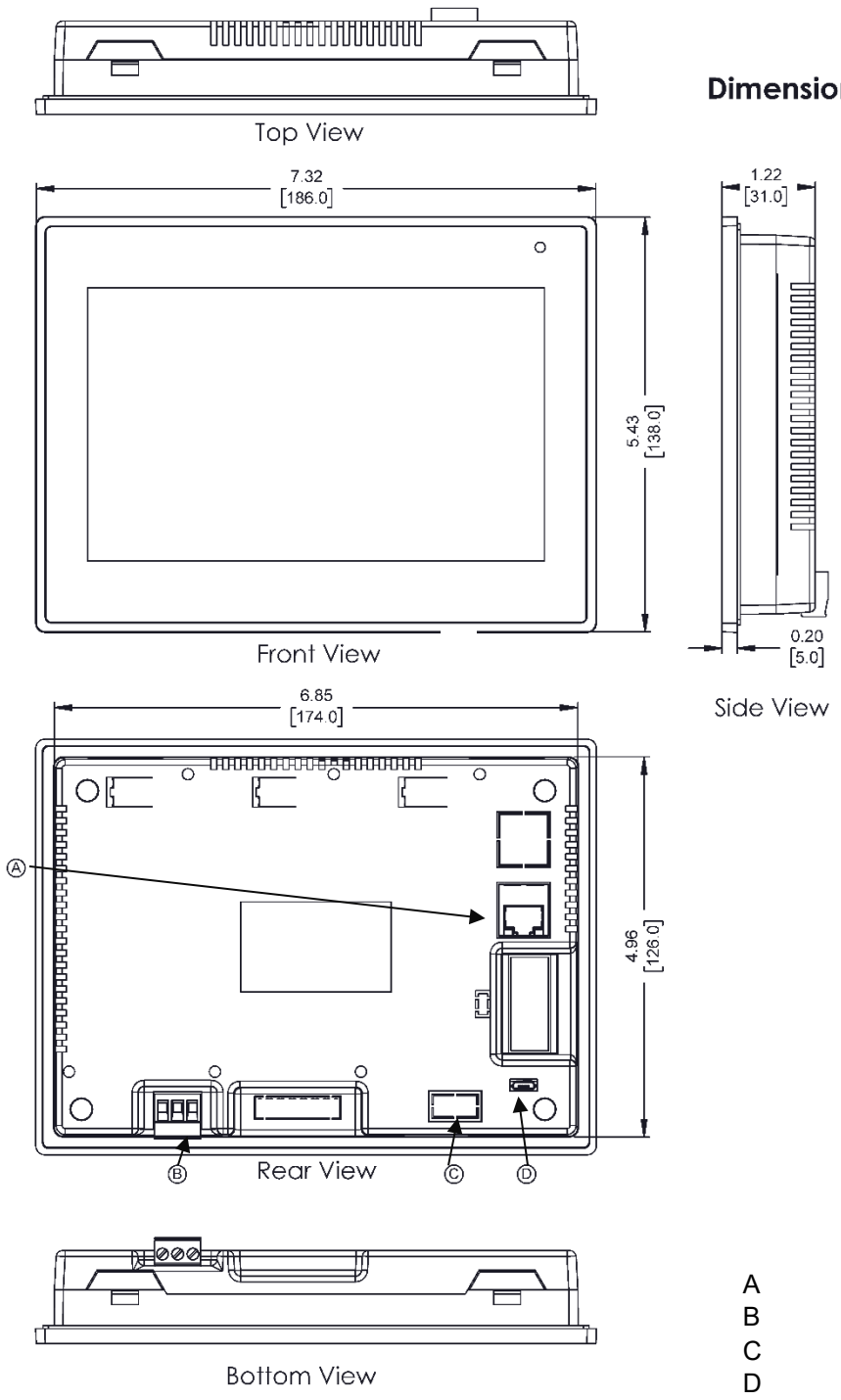
DIMENSIONAL OUTLINES

WP4043 Dimensions



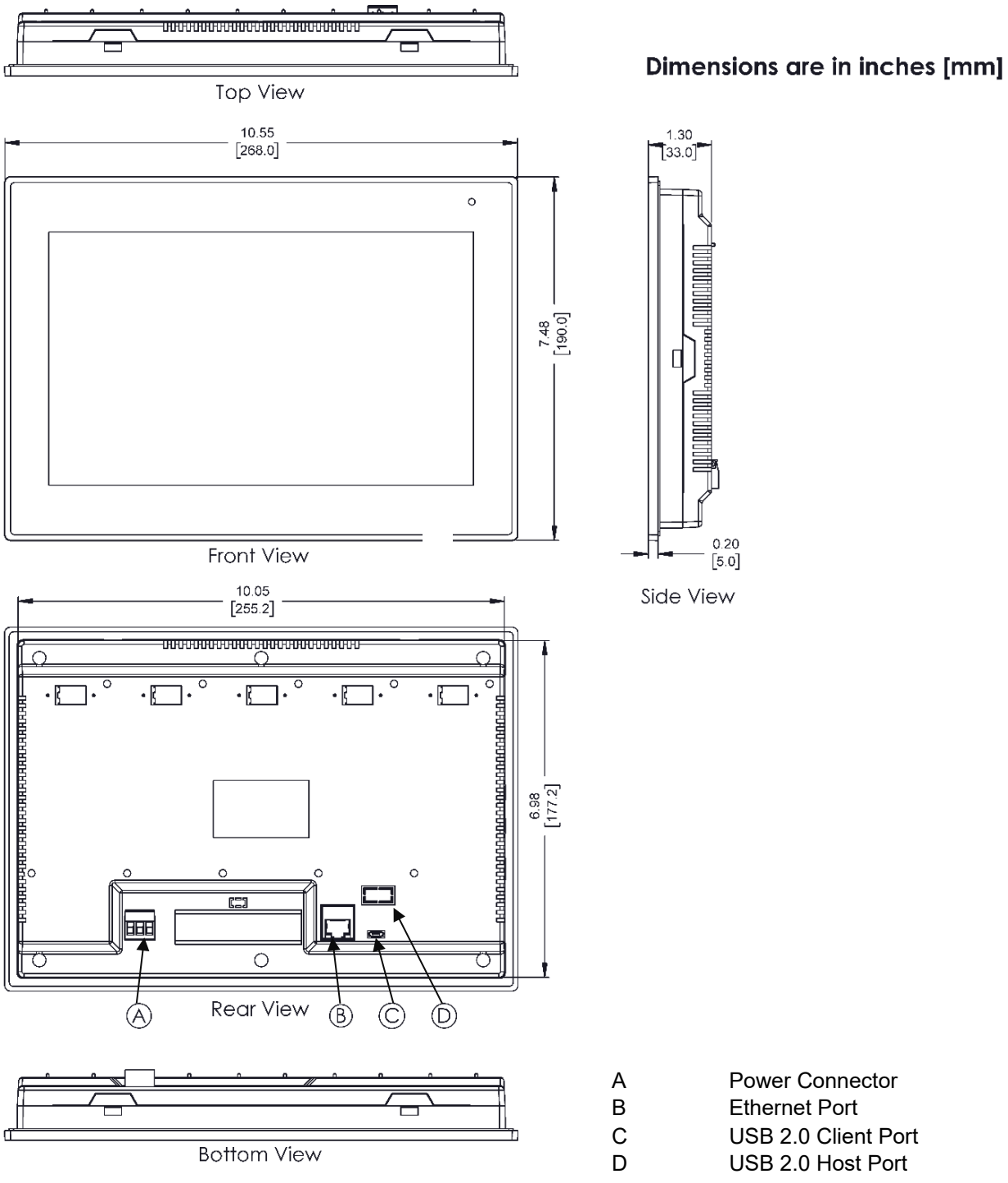
A	Power Connector
B	Ethernet Port
C	USB 2.0 Client Port
D	USB 2.0 Host Port

WP4070 Dimensions



A	Ethernet Port
B	Power Connector
C	USB 2.0 Host Port
D	USB 2.0 Client Port

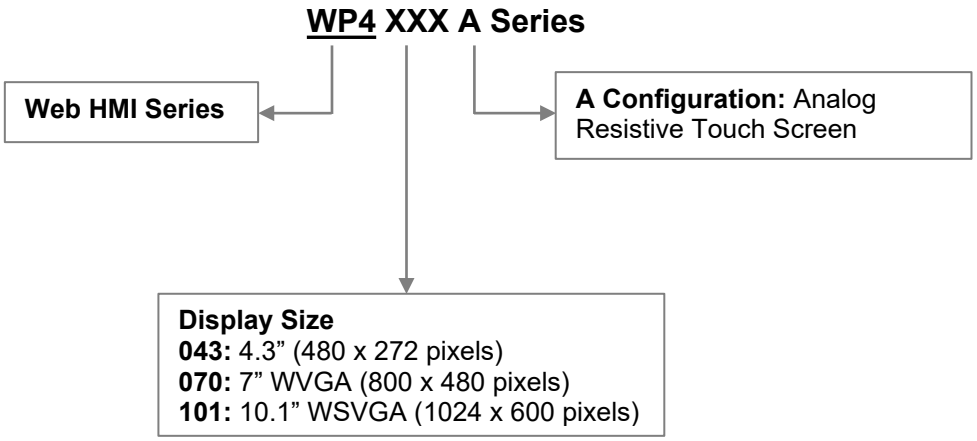
WP4101 Dimensions

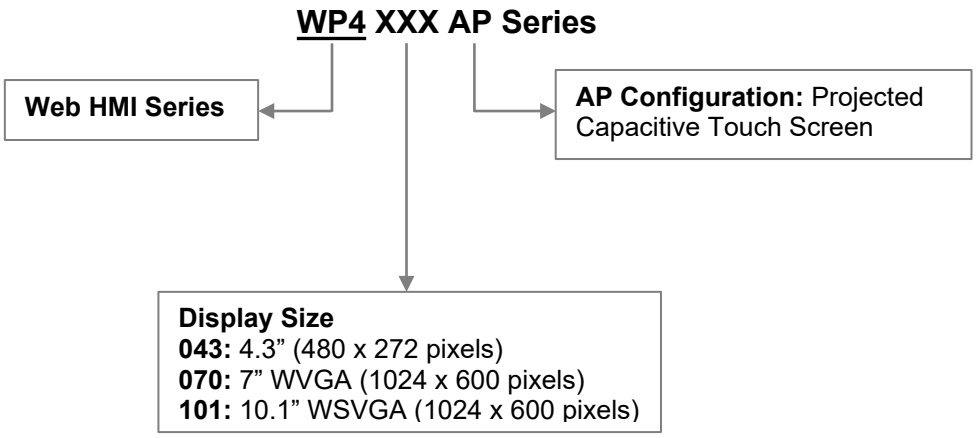


A	Power Connector
B	Ethernet Port
C	USB 2.0 Client Port
D	USB 2.0 Host Port

PART NUMBERING

There are three screen sizes and two configuration options for the Web HMI series; detailed part numbering information is as follows:





MOUNTING WEB HMI SERIES PRODUCTS

Web HMI series products must be panel mounted, using the clamp accessories shipped with the product. Before mounting, make sure that sealing gasket is properly positioned. This gasket forms a compression type of seal. Do not use sealing compounds. Place the unit in the panel cutout and tighten the mounting screws evenly (**torque 0.4Nm**) to maintain water and dust resistance.

The recommended panel thickness is **2mm (12 ga.) to 6mm (2ga.)** To provide the required support and proper sealing, do not mount the Web HMI into a panel thinner than 2mm or thicker than 6mm.

ATTENTION	Do not push directly on the LCD display of the HMI when placing the unit into the panel as it may damage the display. Push on the bezel or the border of the LCD display.

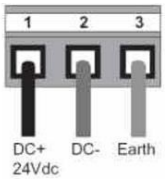
CONNECTING POWER

Web HMI series require 24 VDC to operate. Follow the steps mentioned below to connect a power supply to the device:

- Make sure that the terminal is not connected to the power source.
- Secure the 24 VDC power wires.
- Secure the functional earth ground wire to the functional earth ground terminal screw on terminal block.
- Apply 24 VDC power to the terminal.

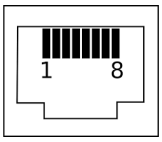
GROUNDING

The optimum method for grounding electronic equipment is to ground it separately from other high-power systems and to ground more than one unit of electronic equipment with a single-point ground. Following marked terminal is provided with the unit for grounding:



I/O PORTS

RJ45/ETHERNET PORT



Connector Type: Standard 8 pin connector

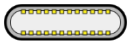
This is used to connect your Web HMI to your web server.

USB 2.0 HOST PORT: TYPE A

Connector Type: Standard 4 pin connector

This port is used to connect a USB 2.0 device (keyboard, mouse) to your Web HMI, allowing use of external USB devices such as a mouse or keyboard.

USB 2.0 CLIENT PORT: TYPE C

Connector Type: Standard 24 pin connector 

This port is intended for use solely by trained technicians in the unlikely event your Web HMI requires service. This port is designed for operator use.

TOUCH OPERATION

The following gestures are implemented in the Web HMIs for navigation and interaction on a web page.

Analog-Resistive Touch (WP4000A models)

Support single touch only.

1. Scrolling: Scrolling is achieved by using the scroll bar on the right for vertical navigation and on the lower screen for horizontal navigation.
2. Tap: A single firm tap allows users to click screen, buttons, open the on-screen keyboard, and more like a mouse click
3. Double Tap: Quickly tapping the screen twice used to open special menus
4. Press and Hold: A long tap that can activate special menus by holding contact on the screen for one second or two.

Note: All WP4xxxA single-touch gestures listed above are available unless the user is connected to a web server that does not support them.

Projected Capacitive Touch (WP4000AP models)

Supports up to 5 simultaneous finger touches

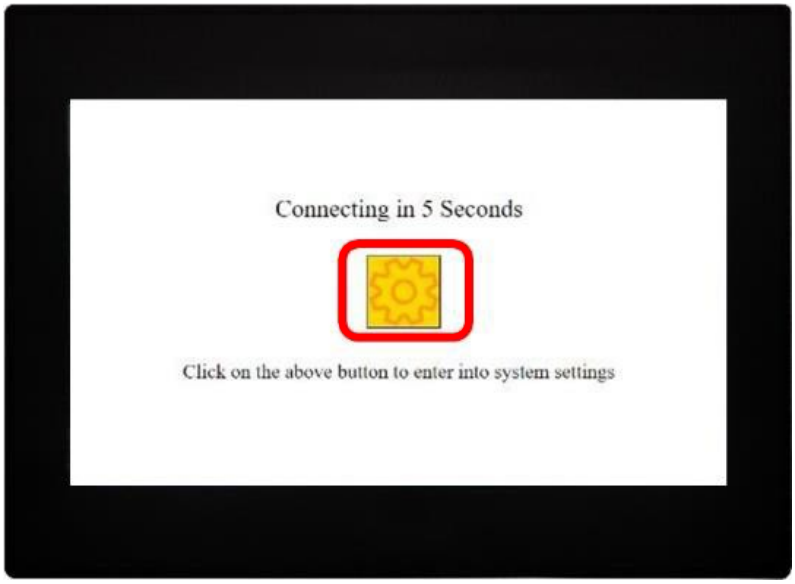
1. Pinch to Zoom: By placing two fingers on the screen and spreading or bringing them together, the user can zoom-in or zoom-out respectfully.
2. Swipe Left: By placing a single finger on the screen and swiping left, user can go to the go forward.
3. Swipe Right: By placing a single finger on the screen and swiping right, user can go to go backward (to the previous page visited).
4. Tap: A single firm tap allows user to click screen buttons, open the on-screen keyboard, and more like a mouse click.
5. Press and Hold: A long tap that can activate special menus by holding contact on the screen for a period
6. Double Tap: Quickly tapping the screen twice used to open special menus
7. Swipe: Tapping and holding the screen while moving across the screen used to navigate between screens, open special menus, and more.
8. Multi-touch: Use multiple fingers to interact with special features

Note: All WP4xxxAP touch gestures listed above are available unless the user is connected to a web server that does not support the gesture(s). Some web servers do not support all touch gestures listed above.

To calibrate the Web HMI Touchscreens, please see the *Calibration Settings* section of the *Device Settings Menu* chapter below.

INITIAL POWER-ON CONFIGURATION

Upon initial unit powerup, the user will see the screen as shown below. To change configuration of the device, press the button within 5 seconds to enter device configuration settings.

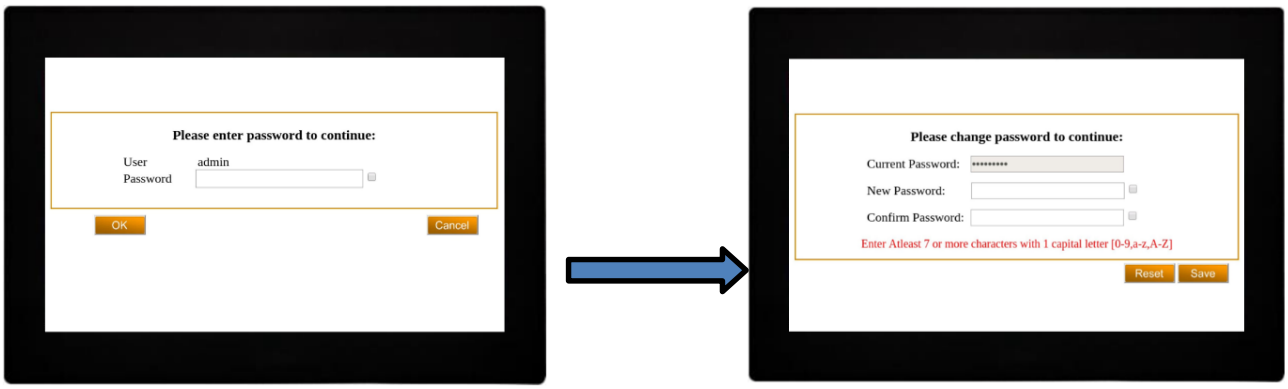


On clicking the button, the following screen will open up. This page is the home page of the device settings screen. The screen shows the product part number along with selectable settings tabs on the left-hand side.

Administrator Password: Clicking on any tab on the left-hand side, the user will have to enter an admin password.

The factory default password for the device is **admin@123**

Clicking on the textbox brings up the On-Screen Keyboard (OSK). Enter the password and click on OK to continue. If a user clicks the box next to the password entry field, the password characters are unmasked.



ATTENTION	The Web HMI password will need to be changed the very first time it is powered up. **The new password must contain a minimum of 7 characters, and feature at least 1 capital letter, 1 lower case letter, and one number.**

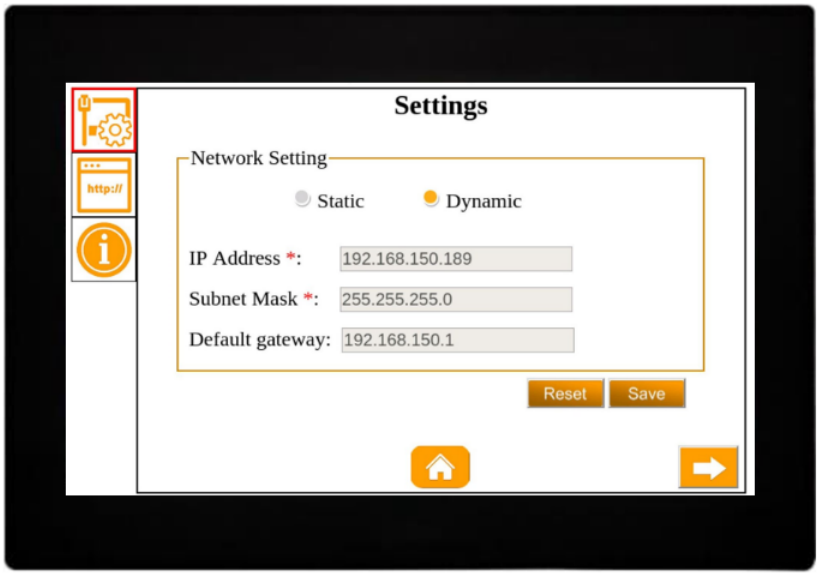
CONFIGURATION MENUS

Button	Description
	**Device Settings Menu** This button is used to enter the device configuration. Settings for Network, Calibration, Password, OSK, Time and Brightness can be accessed using this button.
	**URL Settings Menu** Used to identify the target IP address of the webserver. You can have up to five IP addresses preloaded into your Web HMI for quick access.
	**Device Information Menu** Used to provide identifying information about this unit.

Device Settings Menu

Network Settings

The Network Settings screen will be the first to appear within the Device Settings menu. On this screen the IP of the device can be set. The device defaults to acquire a dynamic IP from the network when connected.



To provide a static IP, the user should click on the “Static” radio button and enter the IP Address, Subset Mask and the Default gateway manually by using the OSK. The OSK pops-up when the respective textboxes are clicked.

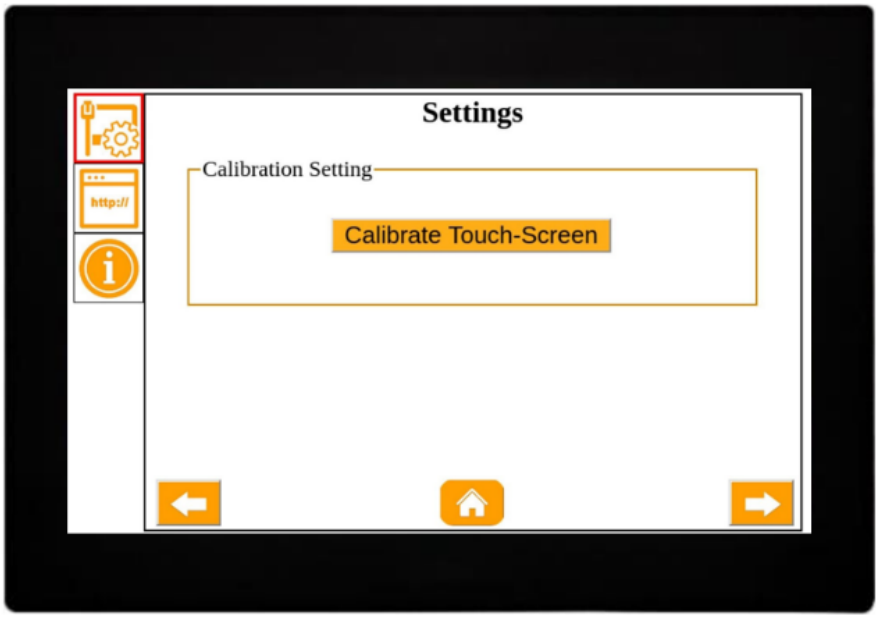
ATTENTION	**To obtain an IP in the dynamic mode, make sure that the device is connected to a DHCP network using an Ethernet cable before powering it on.**

Time Settings: This setting is used to set the Time of the device. On the network settings screen, click on the right arrow at the bottom right corner to view the Time settings. Time setting will be on screen. The device defaults to acquire a NTP Time when connected.

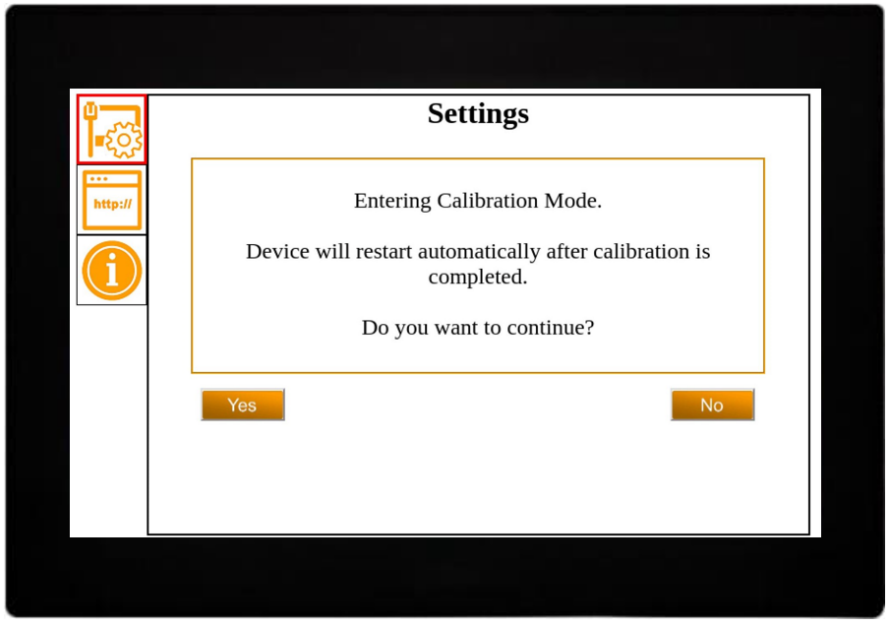
To provide a Manual Time, click on the “Manual” radio button and enter the Date & Time.

Calibration Settings: This setting is used to set the calibration of the touchscreen of the device. The device is already calibrated at the factory before shipping. In case re-calibration needs to be done, this setting screen can be used to calibrate the touchscreen.

On the Time settings screen, click on the right arrow at the bottom right corner to view the calibration settings. Click on the *CalibrateTouch-Screen* button after the screen opens up.



On clicking the Calibrate button a dialog box opens up which asks for a final confirmation before restarting the device in calibration mode.



After entering the calibration mode, the following screens open up. Follow the directions given on the screen to calibrate the touchscreen by touching and releasing the crosshairs.

1st stage

2nd stage

4th stage

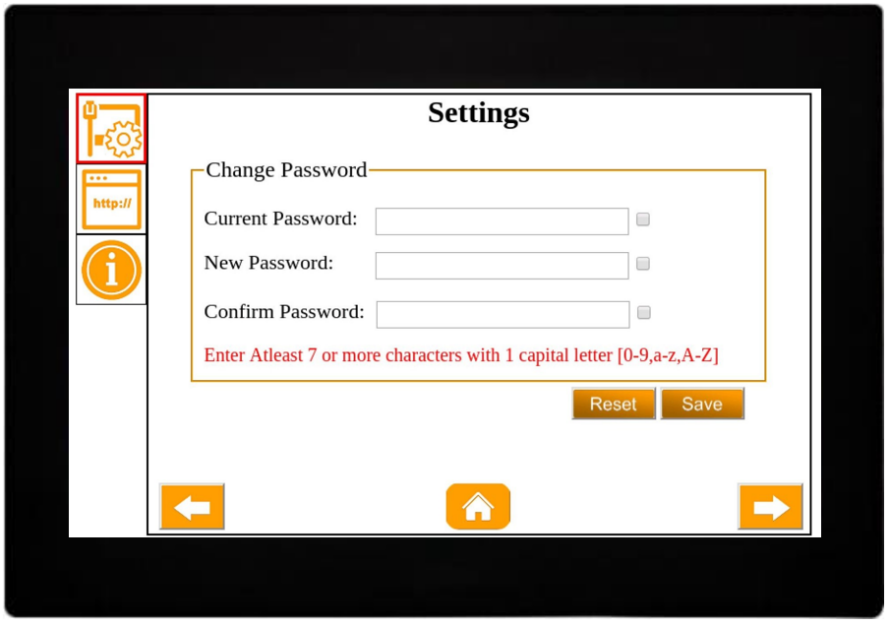
3rd stage

5th stage

Change Password: This setting is used to change the system password of the device.

The initial factory set password is ‘admin@123’. When first powered on, the factory password will be required to change.

The password can be changed regularly through the Change Password window, which is accessed by clicking the right arrow on the bottom corner of the Calibration settings screen.



The current password must be entered using the On-Screen Keyboard (OSK). Clicking into the New Password text box will allow you to assign a new password. If a user clicks on the checkbox next to the text boxes, the password characters will be displayed.

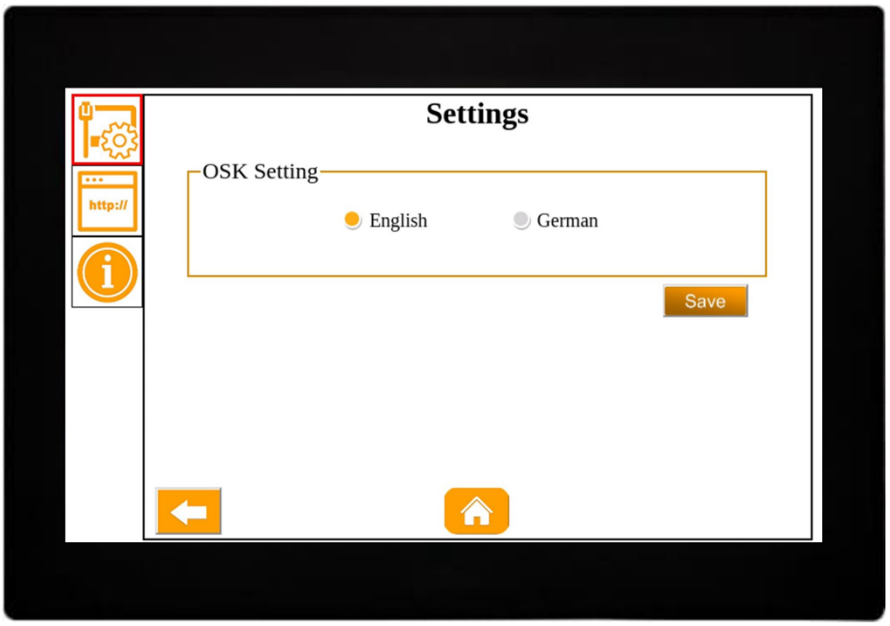
ATTENTION	**The password must be at least 7 characters long with one capital letter (A-Z) and one number (0-9)**

Brightness Control: This option allows you to control the brightness of the Web HMI screen. The Brightness Control window can be assessed by clicking the right arrow on the Change Password Settings window.

The brightness of the screen can be adjusted by clicking the highlighted buttons as shown below.

OSK Setting: This setting allows user to select the On-Screen Keyboard language. The OSK setting screen can be accessed through the network settings icon and clicking the right arrow on the Brightness Control screen.

Clicking on the Language selection radio button will change the language of the OSK.

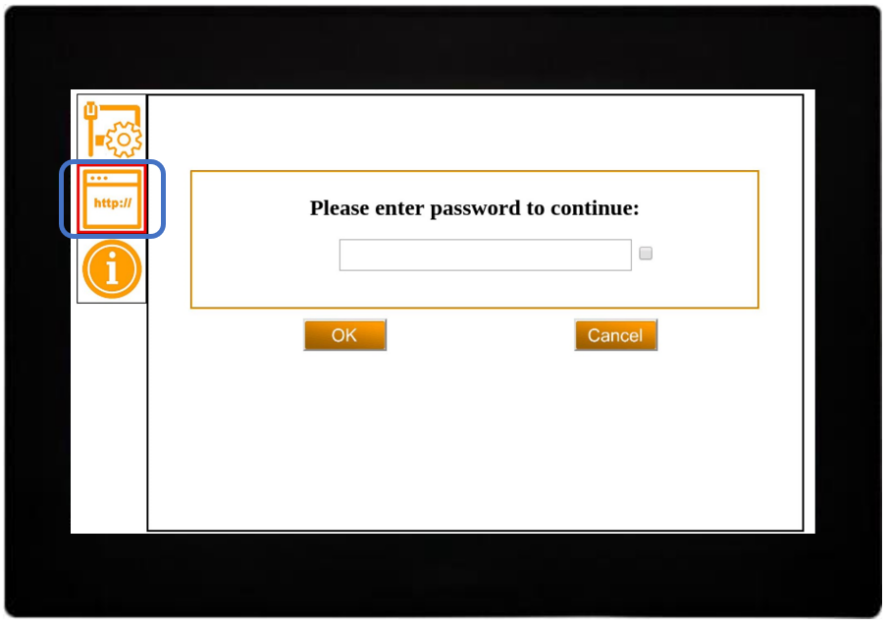


URL Settings Menu

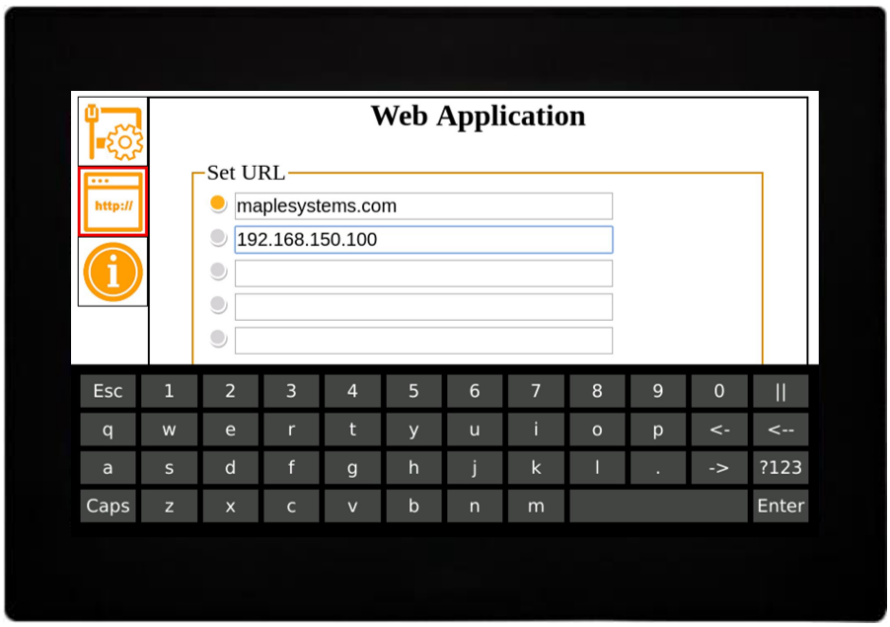
This setting is used to set the web server the Web HMI will connect to. The device does not have any URLs preset and will need to be entered before successfully connecting to a web server.

Users can enter up to 5 URLs or IP addresses of webservers.

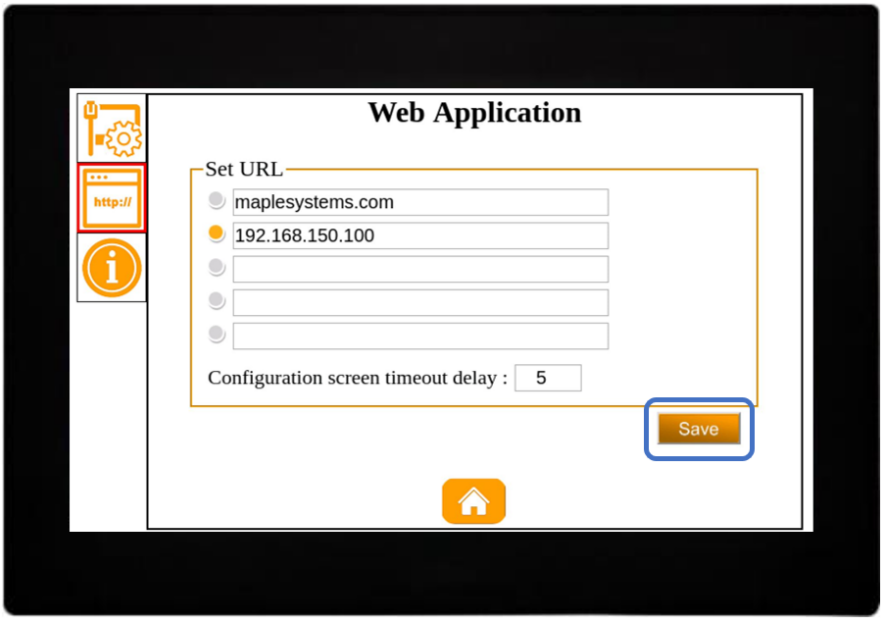
Click on the Web Application settings button, enter password when prompted.



After entering the URLs or IP addresses select the URL that the browser will open upon restart by clicking on the respective radio button.



Click ‘Save’ to save the changes before clicking on the ‘Home’ button and rebooting.



Restarting the device will connect with the selected URL. If the URL or IP address is not available, then an “Error 404: Page not found” message will be shown.

Device Information

Device information will be displayed. On this screen the Product Name, MAC Address, IP Address, Subnet Mask, and Default Gateway will be displayed.

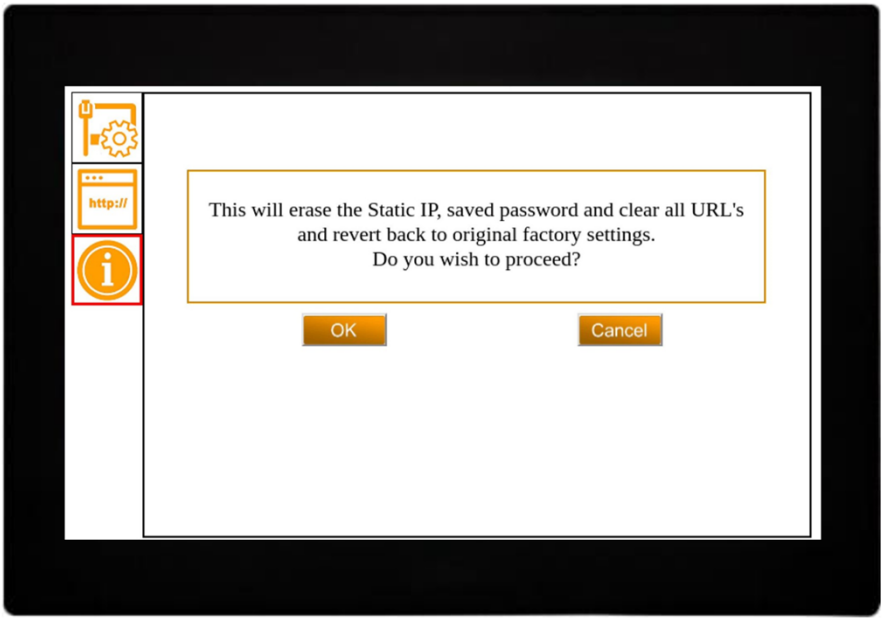
ATTENTION	**This screen does not automatically refresh; clicking on the information icon again will refresh the about section.**

Factory Reset: This setting allows a user to factory reset their Web HMI.

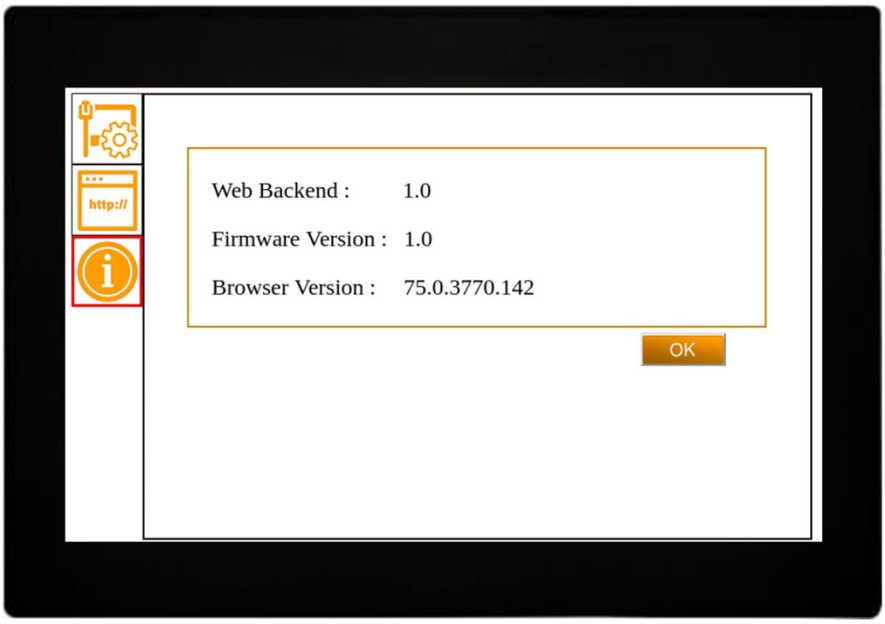
ATTENTION	**Factory resetting the device erases the Static IP, saved passwords, and all URLs while reverting to the original factory settings.**

To get to the Factory settings screen, click the “Factory Reset” button in the Device Information screen.

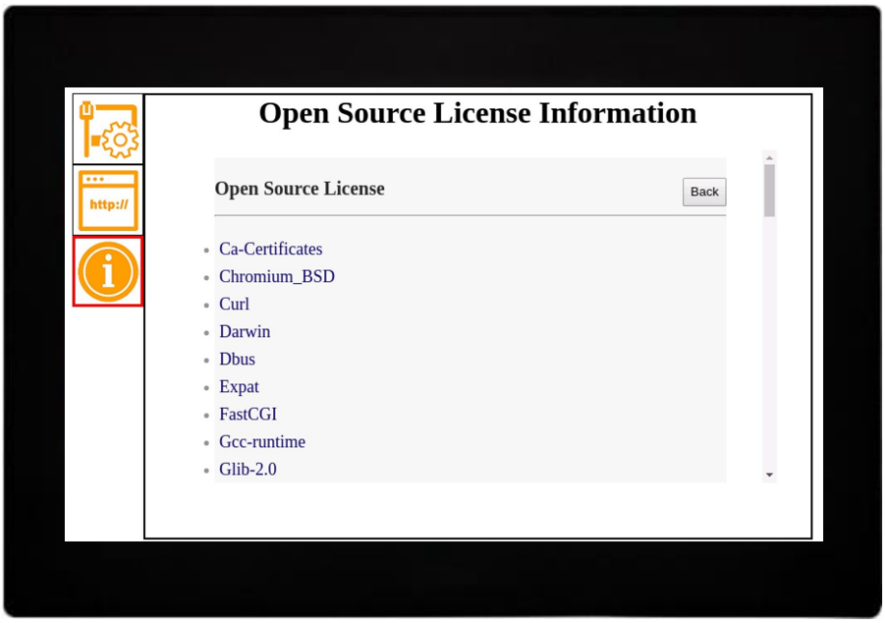
The following confirmation page will appear, click “OK” to continue with factory resetting the Web HMI.



Version Information: This page shows the Web Backend, Firmware, and Browser versions of the device. Can be accessed by clicking the “Version” button on the Device Information window.



Open-Source License Information: The following page has information about open-source licenses used in the Web HMI. Can be accessed by clicking the “License” button on the Device Information window.



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