

# Halogen D20 Display/Controller and MP5 Sensor



Installation Guide

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Revision 1.00

## PRODUCT SPECIFICATIONS

All specifications and descriptions contained in this document are verified to be accurate at the time of printing. However, because continuous improvement is a goal at Halogen Systems, we reserve the right to make product modifications at any time. Revised editions are found on the manufacturer's website: [www.halogensys.com](http://www.halogensys.com). To communicate any inaccuracies or omissions in this manual, send an e-mail to [tech@halogensys.com](mailto:tech@halogensys.com).

## SAFETY INFORMATION

This guide contains important instructions for the Halogen D20™ and the Halogen MP5™ that should be used for installation and basic setup.

The manufacturer is not responsible for any damages due to misapplication or misuse of this product, including, without limitation, direct, incidental, and consequential damages, and disclaims such damages to the full extent permitted under applicable law. The user is solely responsible for identifying critical application risks and installing appropriate mechanisms to protect processes during a possible equipment malfunction.

Please read this entire manual before unpacking, setting up, or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment. Make sure that the protection provided by this equipment is not impaired. Do not use or install this equipment in any manner other than that specified in this manual.

## PRECAUTIONARY LABELS

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol on the instrument is referenced in the manual with a precautionary statement.



**Safety alert:** Indicates a hazardous situation that could result in injury or death. If on the instrument, refer to the instruction manual for operation or safety information.



**Risk of electric shock:** Indicates components or a procedure that risks electric shock, electrocution, or injury.



**Electrostatic discharge:** Indicates the presence of devices sensitive to electrostatic discharge (ESD) requiring that care must be taken to prevent damage to the equipment.



**Disposal:** Electrical equipment may not be disposed of in European domestic or public disposal systems. Return old (or end-of-life) equipment to the manufacturer for disposal at no charge.

## TRADEMARKS

The unauthorized use of any trademark displayed in this document or on the product is strictly prohibited. D20 and MP5 are trademarks of Halogen Systems, Inc. Multiple US and worldwide patents have been granted to Halogen Systems, Inc. for its unique features of Chlorine measurement system sensor systems.

Gems is a trademark of Gems Sensors, Inc. and Modbus is a registered trademark of Schneider Electric USA, Inc. All other trademarks contained in this document are the property of their respective owners, and any use does not imply sponsorship or endorsement of their products or services by Halogen Systems, Inc.

## COMPLIANCE AND CERTIFICATION



**CAUTION:** This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments.

### Canadian Radio Interference-Causing Equipment Regulation, ICES-003, Class A

This Class A digital apparatus meets all Canadian interference-causing equipment regulations requirements.

Cet appareil numérique de classe A répond à toutes les exigences de la réglementation Canadienne sur les équipements provoquant des interférences.

#### FCC Part 15, Class A Limits

Supporting test records reside with the manufacturer. The device complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

1. The equipment may not cause harmful interference.
2. The equipment must accept any interference received, including interference that may cause undesired operation.

Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. 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 their expense. The following techniques can be used to reduce interference problems:

1. Disconnect the equipment from its power source to verify that it is or is not the source of the interference.
2. If the equipment is connected to the same outlet as the device experiencing interference, connect the equipment to a different outlet.
3. Move the equipment away from the device receiving the interference.
4. Reposition the receiving antenna for the device receiving the interference.
5. Try combinations of the above.

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## DECLARATION OF CONFORMITY

Drinking Water Sensors are Tested and certified to NSF/ANSI/CAN 61 and 372 – 2020

Certificate date issued: 7/23/2021



120VAC Displays Also Tested and Certified to:

Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use; Part 1: General Requirements>Valid without technical revision: 01Jan2022< [UL 61010-1:2012 Ed.3+R:16Nov2018]

Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 2-081: Particular Requirements for Automatic and Semi-Automatic Laboratory Equipment for Analysis and other Purposes [UL 61010-2-081:2019 Ed.3]

Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use Part 1: General Requirements>Valid without technical revision: 23Oct2019< [CSA C22.2#61010-1-12:2012 Ed.3+U1]

Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use - Part 2-081: Particular Requirements for Automatic and Semi-Automatic Laboratory Equipment for Analysis and other Purposes [CSA C22.2#61010-2-081:2019 Ed.3]

Manufacturer's Name: Halogen Systems, Inc.  
Manufacturer's Address: 8985 Double Diamond Pkwy Suite B10, Reno, NV 89521  
Type of Equipment: Multiparameter Sensor and Display  
Model No: D-H1LF-P and D-H1NF-P and CN-01, CN-04

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive and Standard.

Place: Reno, Nevada USA  
Date: December 9, 2021

(Signature)  
Michael Silveri, President

### GETTING TECHNICAL ASSISTANCE

To get assistance for product installation or commissioning, contact Halogen technical support at [tech@halogensys.com](mailto:tech@halogensys.com).

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# Getting Started

## Welcome to the Halogen family of products

The D20 is a multichannel display/controller for Halogen MP5 and other Halogen sensors. The combination of the Halogen D20 and MP5 represents a proprietary hardware and software system enabling real-time insights and intelligent analysis of onsite water quality.

The photograph below shows a demonstration of the D20 display/controller (on the left) and the MP5 sensor (on the right) mounted on a custom backplate to wall:



(on the wall)

The controller shows sensor measurements and other data on the display, transmits analog and digital signals, and interacts with other devices through outputs and relays. Outputs, relays, and sensors are configured and calibrated through the user interface on the front of the controller or remotely for network-connected controllers.

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**Note:** For product information, visit [www.halogensys.com](http://www.halogensys.com) or the Halogen information center at [www.halogensys.com/resources](http://www.halogensys.com/resources).

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## How to use this guide

Special symbols are used throughout the guide and should be taken seriously during the installation and initial commissioning of the Halogen D20 and Halogen MP5:



**Explosion hazard:** Indicates the risk of a severe hazardous situation that could result in serious injury or death.



**Danger:** Indicates a hazardous situation that could result in injury or death.



**Warning:** Indicates components or a procedure that risks electric shock or injury.



**Caution:** Indicates a hazardous situation that could result in minor injury or equipment damage.

**Note:** A best practice alert, tip, or technique that results in successful results.

There are five steps to be performed in completing a typical D20 and MP5 installation:



1. **Planning:** Unbox and inspect the box content and gather tools necessary for installation. Make sure the site is ready for product mounting.
2. **Install the display/controller:** Mount the D20 display/controller.
3. **Set up Halogen sensor:** Make sure the connections are set up, turn on water flow, and purge air from the flow cell.
4. **Start up and commission:** Connect the MP5 sensor and connect it to the controller. Power on the controller and check the parameters on the display against a colorimeter and a pH meter. If calibration is required, calibrate pH first and then Chlorine.
5. **Set up additional control features:** This section includes a number of special installations and setup instructions including how to install the sensor.

# Installation Instructions

## Step 1: Planning



To plan for D20 and MP5 installation, become acquainted with the following:

- [Power and connectivity at the site of the installation](#)
- [Know what is in the product boxes](#)
- [Identify the tools necessary to bring onsite for the installation](#)

### AVAILABILITY OF SERVICES AT THE SITE

There are several critical site services that need to be confirmed by the installer:

1. **Power:** For 120VAC operation, you will need a 120VAC (NEMA5) receptacle to plug in the controller. For 240VAC, you must remove the power cable and install the appropriate conduit and fittings (½" trade size conduit fitting).

The maximum power rating should be correct for the location's ambient temperature.

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**Note:** Ambient temperature rating refers to the relationship between the label power rating, the application ambient operating temperature, and the actual power capacity after required derating if necessary.

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2. **Communication:** For 4-20mA operation, use 8-conductor 22 AWG cabling.
3. **Mount:** The controller should be installed where the power disconnect device for the controller is easily accessible. A minimum of 6.3 in (16 cm) of clearance is required for the controller door to open.
4. **Orientation:** The controller should be installed upright and level to a panel or vertical/horizontal pole.
5. **Site safety:** There must be sufficient clearance around the installation to make connections and to perform maintenance tasks. The installation must be in a location with minimal vibration.



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**Warning:** Externally connected equipment must have an applicable country safety standard assessment.

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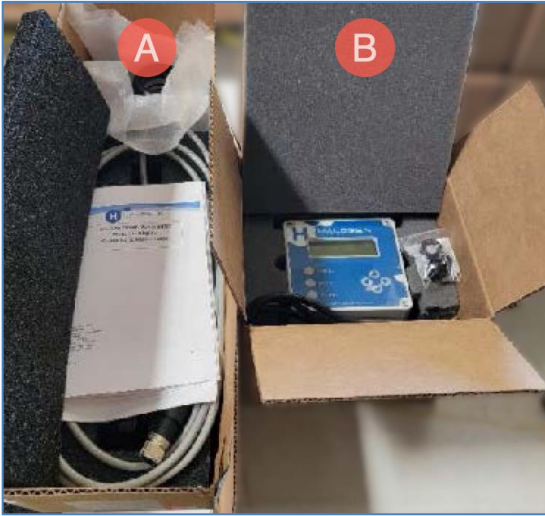
**Explosion hazard:** This manual is only for installation of the unit in a non-hazardous location. Use only the instructions and approved control drawing provided in the hazardous location installation manual for installation in hazardous locations.

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If you have any questions, contact your Halogen representative.

## WHAT'S IN THE BOX

Open the two boxes to show the MP5 sensor and the D20 display/controller:



Item	Description
A	MP5 sensor
B	D20 display/controller

**Note:** product technical details be found in the [technical specifications](#) at the end of this guide.

Unpack the cardboard box protection liners and carefully remove its contents. The boxes should contain the following items:

D20 display/controller	MP5 sensor
<ul style="list-style-type: none"><li>▪ D20 display/controller</li><li>▪ Mounting tabs for wall mount</li><li>▪ Strain relief for 4-20mA cable</li><li>▪ This installation guide</li></ul>	<ul style="list-style-type: none"><li>▪ MP5 sensor for FC installation</li><li>▪ Flow cell with push-to-connect tubing fittings</li><li>▪ 3/8" tubing (push-to-connect) adapters</li></ul>

If in the unlikely event that something is missing, contact Halogen Systems before proceeding with the installation.

## WHAT YOU'LL NEED

You'll need these tools and materials to install the display/controller and the sensor:

- #2 Phillips and flathead screwdrivers
- Screws that are appropriate for mounting the products on a wall or pipe

Depending on how the products will be installed, you may need other tools not described in this guide.

### Before proceeding to the next step ...

1. Put away the empty boxes and packing material for safe keeping.
2. Determine the best, safest location for mounting the display/controller.
3. Gather all the tools you'll need for the site installation.
4. Don't forget to use our [checklist](#) to check off tasks during installation.



## Step 2: Install the D20 display/controller

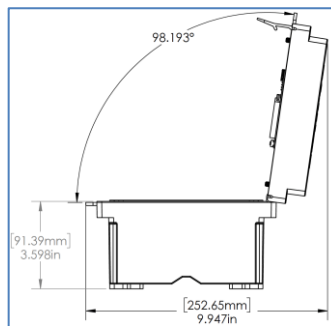


To perform D20 installation, you will:

- [Mount the enclosure to a wall](#)
- [Mount the D20 to a pole](#)
- [Configure the electrical connectors and fittings](#)
- [Connect the 4-20mA cabling](#)

### MOUNT THE ENCLOSURE

Place the D20 on a flat surface, like a workbench. The maximum area needed for the D20 enclosure and the opened front cover is shown below:



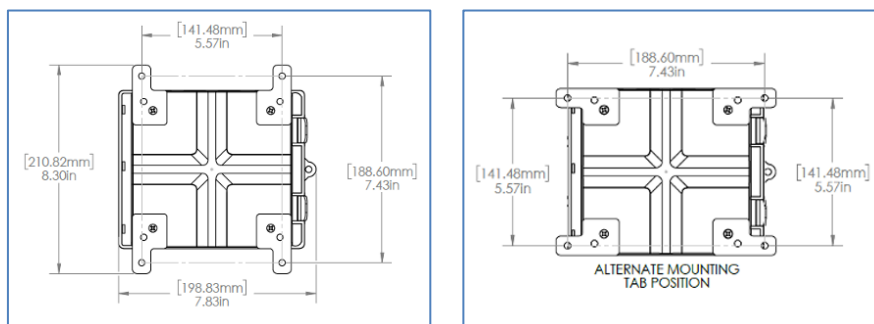
There are two ways to install (mount) the D20 at the site:

- Mount to a wall or
- Mount to a pole

### TO MOUNT THE D20 TO A WALL

With the cover closed, carefully place the D20 on a flat work surface exposing the back of the enclosure.

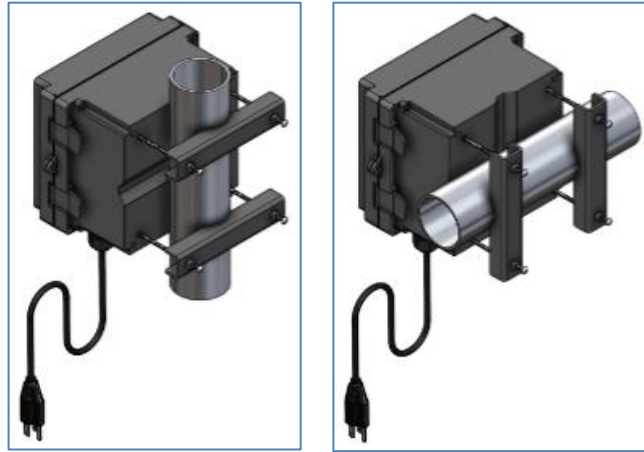
1. Depending on the wall surface, you can align the mounting tabs vertically (L) or horizontally (R). Remove the four screws that secure the mounting tabs, reorient the tabs, and reattach the tabs onto the D20's base.



2. Attach the enclosure to the wall with the appropriate wall-mounting screws (not included) that will firmly hold the enclosure to the wall. Make sure that all four corner mounting tabs are attached.

### TO MOUNT THE D20 TO A POLE

Similar to the instructions for mounting the D20 to a wall, attach the controller upright to a pole or pipe with a diameter between 19 to 65 mm (0.75 to 2.5 in) that has either a vertical (L) or horizontal (R) orientation:

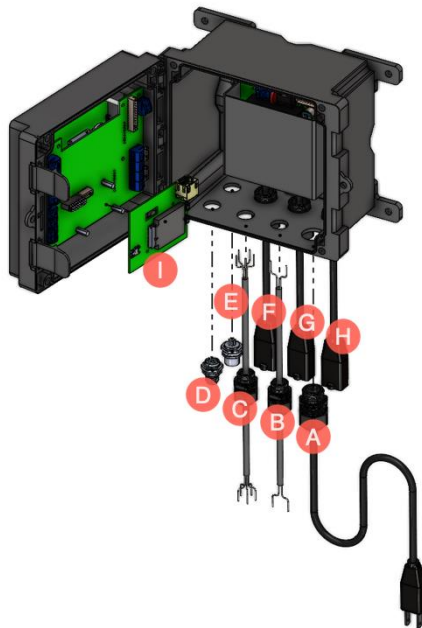


### CONNECT ELECTRICAL CONNECTORS AND FITTINGS

At the bottom of the D20 enclosure are the electrical connectors and fittings for the instrument. To maintain the enclosure’s environmental rating, ensure the following:

- Strain relief must have an electrical cable that is within its specified diameter range.
- Hole plugs should remain installed onto any unused connectors.

While the D20 controller doesn’t require “hard wiring” of connectors, it offers the following connection options:



A	120V power*
B	2P conductor wire for alarm (optional)
C	5P conductor wire for liquid and flow sensor (optional)
D	M12 4P connector for Halogen MP5 sensor
E	8P 4-20mA connection (optional)
F	120V power output for controlling pumps* (optional)
G	120V power output for controlling pumps* (optional)
H	120V power output for controlling pumps* (optional)
I	Communications board (BLE and cellular)

\*240V available with 1/2" conduit



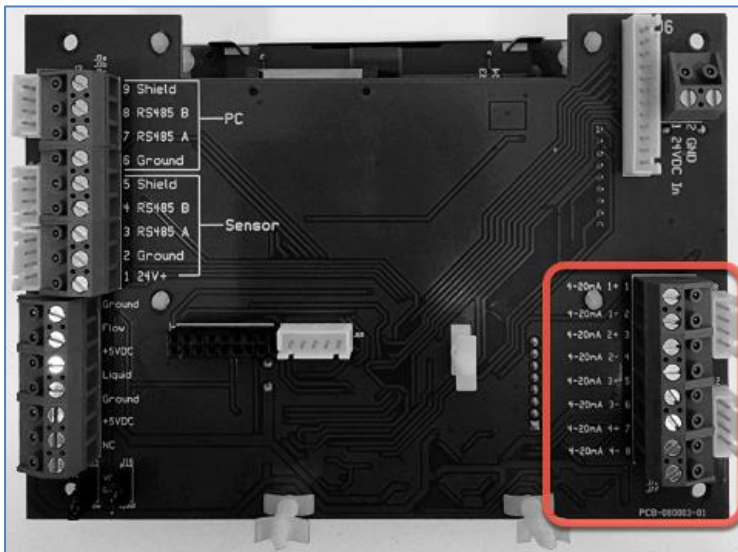
**Warning:** Do not plug in the power cable to a power outlet yet!

To gain access to wiring connections, open the controller by unscrewing the four screws on the cover (L) and pull open both latches on the cover (R):



### CONNECT THE 4-20mA WIRING

Connect the 4-20mA wiring with an 8-conductor 24AWG cabling (0.21" OD) on the terminal block (in the lower-right corner of the motherboard) using the wiring diagram:



Output	Cabling
1	Chlorine positive (+)
1	Chlorine negative (-)
2	PSU positive (+) or conductivity
2	PSU negative (-) or conductivity
3	Temperature positive (+)
3	Temperature negative (-)
4	pH positive (+)
4	pH negative (-)

**Note:** The 4-20mA connection is *not* loop powered.

## Step 3: Set up Halogen sensor



To install and purge the flow cell, you will perform these tasks:

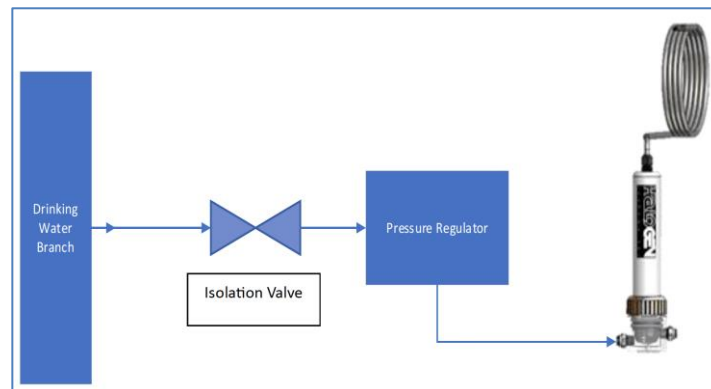
- [Learn about the side stream sensor](#)
- [Install the flow cell](#)
- [Properly position the flow cell](#)
- [Connect devices to the M12 connector](#)

### USING THE HALOGEN SIDE STREAM SENSOR

A typical installation consists of the flow cell version of the sensor and the 120VAC display/controller. (To learn about other installations, visit the [Halogen website](#).)

The *Halogen side stream sensor* is a compact device that connects to a drinking water source using ¼" ID tubing. It requires very little flow and is unaffected by changes in the flow rate; however, long tubing may delay readings. The sensor is enclosed in a clear acrylic flow cell designed to purge air. The inlet pressure should be limited to 60 PSI. The flow rate can be from 0.1 LPM to 1.0 LPM.

The sensor is usually connected to a potable water line, as shown below:



The pressure-reducing valve is needed if the supply water line pressure exceeds 60 PSI/4 Bar. The flow cell is equipped with ¼" *John Guest push-to-connect* (PTC) fittings on both the inlet and the outlet. A short length of tubing is supplied for each connector.

## TO INSTALL THE FLOW CELL

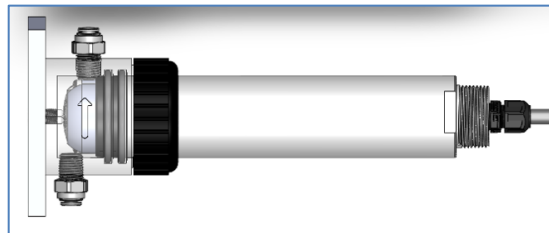
The sensor is shipped dry, and once installed and water flow has been established, the pH portion of the sensor will become wet and stabilize, producing accurate readings within 5 minutes. To prepare the Chlorine sensor for operation, do the following:

1. Mount the flow cell on a vertical surface with the arrow oriented vertically to purge air.
2. Insert the sensor into the acrylic flow cell with the outlet port of the sensor (see figure to the right) facing up near the outlet of the flow cell.
3. Seat the sensor firmly (as far as it will go).
4. Hand-tighten the collar thread downward until it stops. Do not force.



## POSITIONING THE FLOW CELL

The flow cell must *always* be installed vertically where the outlet port points upward toward the outlet tubing (shown below). This orientation ensures that air bubbles properly clear away from the sensor.



## CONNECT DEVICES TO THE M12 CONNECTOR

Connect all digital devices (e.g., sensors and analyzers) to the device connectors on the D20 (see "[Connect electrical connectors and fittings](#)"). Keep the unused device connector caps for future use.

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**Note:** Make sure that service cables do not cause a trip hazard, are too tight, or have sharp bends.

---

## Step 4: Start up and commission



To start up and commission the system, do the following:

- [Power up the D20](#)
- [Monitor the D20 start-up on the display](#)
- [Establish the time of day](#)
- [Configure communication](#)

### APPLY POWER TO THE D20

Before starting up the display/controller, ensure adequate flow through the flow cell. Plug the D20 power cable into a power outlet.

### MONITOR THE D20 START-UP PROCESS

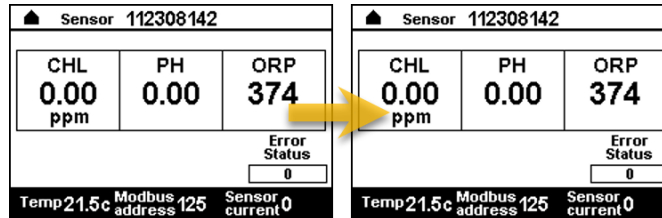
On the display panel, press on the buttons below the display window to select and enter values on the D20:



As the D20 powers up, the display shows a series of status messages like the following:



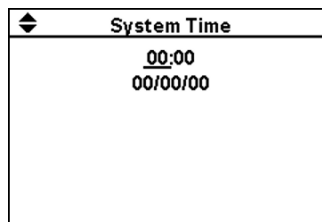
When the D20 power-up is completed, the sensor will start its start-up sequence (L). Once completed, all pertinent sensor information is displayed (R):



Verify all sensor values displayed on the D20. If pH requires calibration, perform that step first before continuing. Check the Chlorine level using a handheld pocket colorimeter and adjust the calibration as needed.

### SET TIME OF DAY

Select the time of day:

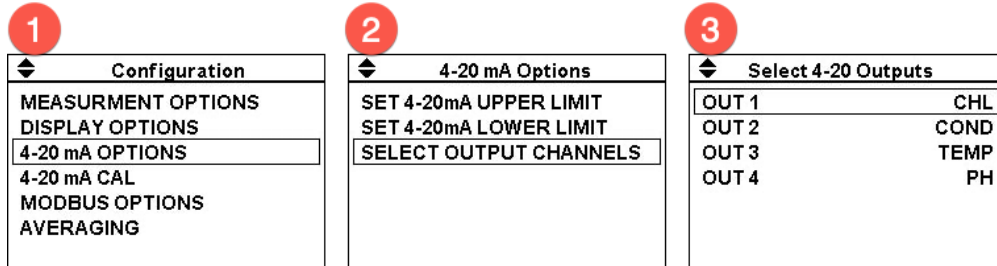


## CONFIGURE COMMUNICATION

The final installation task is communication setup and configuration. Use the arrow keys on the D20 to select menu options (the Enter button accepts the change and the Back button exits the menu screen).

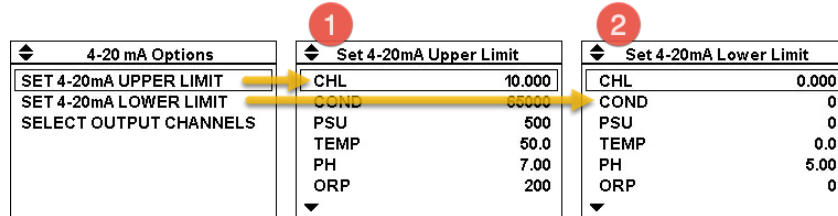
### To set up a 4-20mA communication connection to a PLC:

1. Select CONFIGURATION on the D20 display/controller panel and choose 4-20 mA OPTIONS.
2. Go to SELECT OUTPUT CHANNELS.
3. Select OUT1 (or any of the four channels).



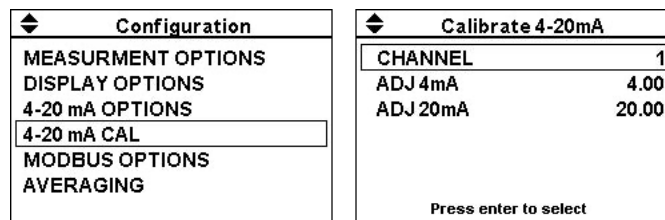
### To set the scaling limits between the PLC and the D20:

1. In the **4-20mA Options** menu, select and change the values for **Set 4-20mA Upper Limit**.
2. Back out to the **4-20mA Options** menu, select and change the values for **Set 4-20mA Lower Limit**.



### (Optional) To calibrate the outputs:

The 4-20mA outputs on the D20 are already calibrated at the factory. If the settings do not match those on your PLC, select **4-20 mA CAL** option from the **Configuration** menu to recalibrate the channel, 4mA, and 20mA values:



## Step 5: Set up advanced features



### INSTALL THE SENSOR

To install an MP5 sensor to the D20 display/controller, you will:

- [Install the sensor](#)
- [Connect the sensor to the controller](#)
- [Using a sensor interlock](#)



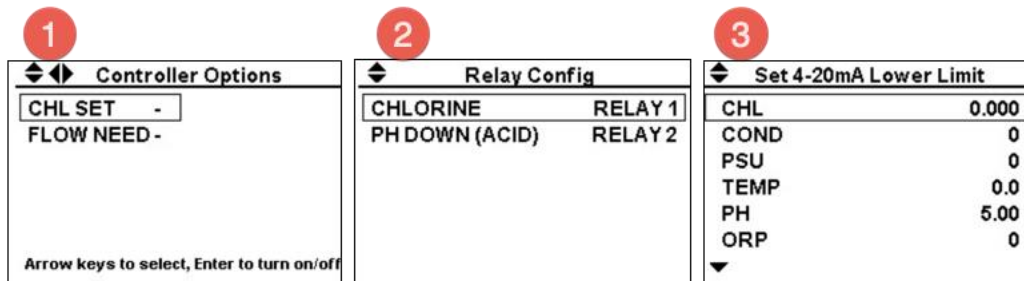
**Warning:** Do not plug in the power cable to a power outlet yet!

### INSTALL THE SENSOR

A flow sensor must be installed and configured in the D20 controller if Chlorine and acid feeds are used. A flow sensor ensures water flow when pumps add chemicals. The controller should be set according to the following:

When **FLOW NEED** is set to a numeric value on the controller, relay activation will only occur when the flow reading exceeds 0. If **No Flow** is displayed on the controller, the flow value will be displayed as a positive number once flow commences.

1. As Chlorine tablets typically reduce pH, select **CHL SET > CHLORINE**.
2. Set **4-20mA Lower Limit > pH** to a numeric value on the controller.
3. (Output relay 2 should be used to add a base chemical to decrease the pH level.)



### CONNECT THE SENSOR TO THE CONTROLLER

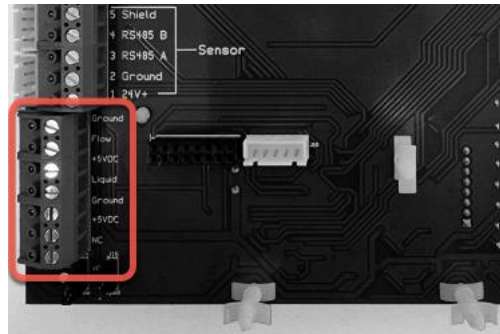
Use the following pinouts to connect sensors to the controller:

Pin	Input	Color
1	Ground NC	Black
2	Flow	Brown
3	Liquid +5VDC	Red

The 7-pin terminal block J2 is used for the input from various sensors (ex: flow sensor, flow switch, optical liquid sensor). The flow sensor connects to pins 5, 6, and 7.

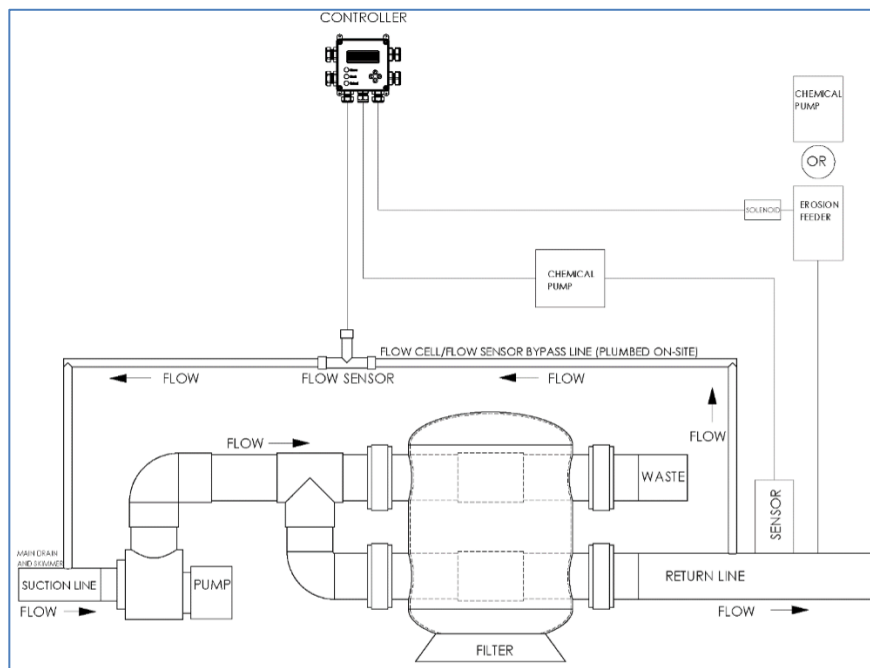


4	Ground	Green
5	L	Black
6	+5VDC	Red
7	NC	White



### USING A FLOW SENSOR INTERLOCK

The system will not energize the chemical pumps if sufficient flow is absent. Enable **Flow Sensor Interlock** (disabled by default) on the controller. The D20 is designed to work with Gems™ Sensors RFO series flow meters as shown below. (Cables should be wired to block terminals OD and SR.)



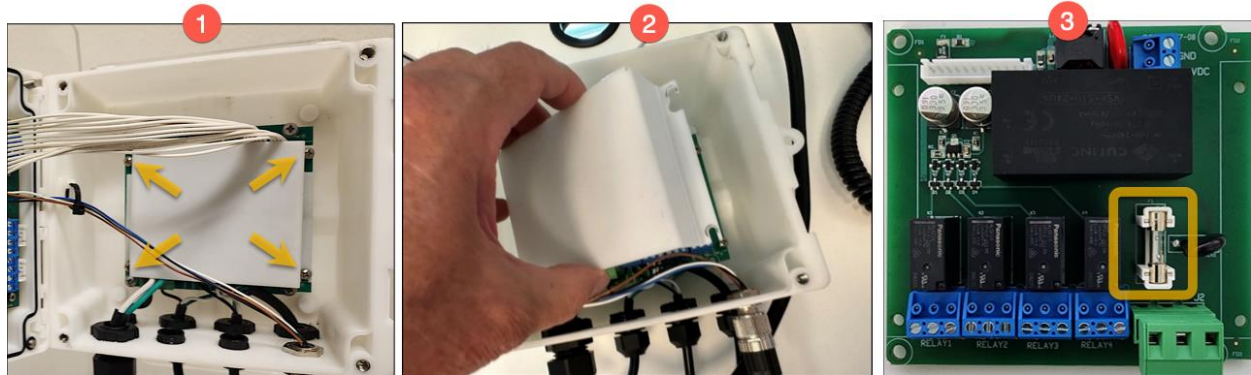
# Installation checklist



Done	Task
<b>Step 1:</b> Planning	
<input type="checkbox"/>	Make sure power and connectivity services are available at the site
<input type="checkbox"/>	Confirm that everything is included in the box
<input type="checkbox"/>	Gather the tools necessary for the installation
<b>Step 2:</b> Install the D20 display/controller	
<input type="checkbox"/>	Mount the enclosure to a wall or to a pole
<input type="checkbox"/>	Configure the electrical connectors and fittings
<input type="checkbox"/>	Connect the 4-20mA cabling
<b>Step 3:</b> Set up Halogen sensor	
<input type="checkbox"/>	Learn how the Halogen side stream sensor works
<input type="checkbox"/>	Install the flow cell (it must be vertically oriented)
<input type="checkbox"/>	Connect devices to the M12 connector
<b>Step 4:</b> Start up and commission	
<input type="checkbox"/>	Power up the D20 display/controller
<input type="checkbox"/>	Monitor the D20 start-up status on its display panel
<input type="checkbox"/>	Set the time of day
<input type="checkbox"/>	Configure communication
<b>Step 5:</b> Set up additional control features	
<input type="checkbox"/>	Install the sensor, connect to the D20 display/controller, and set up flow sensor interlock

# Troubleshooting/FAQ

Issue (or what if this happens)	Answer
How can I check if any fuses have blown in the D20?	With the D20 cover opened, remove the four screws from the high-voltage shield (1), remove the shield exposing the underlying PCB (2), and replace any blown fuses (3). Use part number: 5x20mm Slow Blow 3.5A.



How do I find out more technical information?	Resources are available at <a href="http://www.halogensys.com/resources">www.halogensys.com/resources</a> .

Contact [Halogen support](#) if you have any questions. We're here to help!

# Appendix A: Halogen D20 Display/Controller

## Technical Specification

Overall*	
Description	Microprocessor-controlled, menu-driven controller that communicates with the sensor
Dimensions	6.3" H x 6.3" W x 4" D (160 x 160 x 101.6 mm)
Weight	3 lbs (display)
Display technology	3.5" TFT
Enclosure rating	IEC/EN 60529–IP 65, NEMA 250 type 4X, plastic enclosure
Installation category	Category II
Compliance certifications	CE, ETL certified to UL and CSA safety standards (with all sensor types), FCC, EU, UKCA
Warranty	12 months
Environmental*	
Operating temperature	-20 to 60°C (-4 to 140°F) (8W (AC)/9W (DC) sensor load) -20 to 45°C (-4 to 113°F) (28W (AC)/20W (DC) sensor load) Linear derating between 45 and 60°C (-1.33 W/°C)
Storage conditions	-20 to 70°C (-4 to 158°F), 0 to 95% relative humidity, non-condensing
Altitude	2000 m (6562 ft) maximum
Pollution degree	4
Temperature	Minimum: -40°F (40°C) Maximum: 167°F (75°C)
Power, data storage, and connectivity*	
Power requirements	85 to 240VAC ±10%, 50/60Hz; 1 A (28W sensor load)
Protection class	I, connected to protective Earth
Measurement interfaces	Two MP5 Modbus connectors
Relays	Three relays (SPDT) Wire gauge: 0.75 to 1.5 mm <sup>2</sup> (18 to 16AWG) Maximum switching voltage: 100 - 240VAC Maximum switching current: 5A Resistive/1A pilot duty maximum switching power: 1200VA resistive/360VA pilot duty
Communication	Analog: Four 0-20mA (or 4-20mA) analog outputs Digital: Modbus RTU standard
SD card	Used for data upload, software download, capable of est. 1M data points/sensor
Real-time clock	Battery, estimated to last 5 years

\* Subject to change without notice

# Appendix B: Halogen MP5 Sensor Technical Specification

Overall*	
Measurement method	Reagentless, three electrodes, no membrane or electrolyte
Chlorine measurement range	0 to 20 ppm
- Limit of detection (LOD)	30 ppb (0.03 ppm)
- Limit of quantitation (LOQ)	90 ppb (0.09 ppm)
Resolution	0.001 ppm (1 ppb)
Chlorine accuracy	±3% of the reference test <sup>1</sup> (DPD) at constant pH less than 7.2 (±0.2 pH unit) ±10% of the reference test <sup>1</sup> (DPD) at stable pH less than 8.5 (±0.5 pH unit from the pH at calibration)
Calibration stability	6 months (typ)
Accuracy over change <sup>1</sup>	15% of the measured value + 0.2 mg/L <sub>1</sub>
Turbidity in sample without impact	3000 ppm (Arizona test dust fine, 50-micron size)
Response time (secs) <sup>2</sup>	112 seconds
Measurement interval	50 seconds
pH range (Chlorine)	6.5 to 9.5
Pressure limit	10 bar (145 psi)
Temperature	{no value}
Sample compensation	Conductivity, pH, and temperature
Factory calibration performed	Yes
Power consumption	24VDC ±10% at 50mA maximum
Data transfer	Through controller or PLC

\* Subject to change without notice

<sup>1</sup> Specified in 0 to 65,000 µS without calibration

<sup>2</sup> 90% at stable temperature and pH

## Appendix C: Sensors and Accessories

Sensor PN <sup>1</sup>	Application	Accessory PN <sup>1</sup>	Description	Notes	Cable lengths	Sensor connection
D-LF	Drinking water	FC-01	Side stream flow cell kit low flange	Side stream	5' (up to 75')	M12-4
W-LF	Wastewater					
D-MF	Drinking water	PT-01	Direct in pipe: 2" PCV socket tee with sensor mount adapter, medium flange	Direct in pipe	5' (up to 75')	M12-4
W-MF	Wastewater					
D-MF	Drinking water	MA-2	Direct in pipe: 2" Threaded sensor mount adapter, medium flange	Use with metal pipe	5' (up to 75')	M12-4
W-MF	Wastewater					
D-NF	Drinking water	WT-01	Wet tap with remover assembly and isolation chamber	Use with corp stop valve and saddle, appropriates for size and material	5' (up to 75')	M12-4
D-LF	Drinking water	IM-01	Immersion sensor with 1" 45° adapter or 1" pipe boom mount	Pipe and boom mount (not included)	5' (up to 75')	M12-4
W-LF	Wastewater					

<sup>1</sup> Part number

## Appendix D: Display Options

Base	Input power cable	Com PCB	Output connector 1 sensor 1	Output connector 2 sensor 2
24VDC FC	None	North America	M12-4 sensor	None
24VDC FC	None	North America	M12-4 sensor	None
24VDC FC	18 SWG cable	None	M12-4 sensor	None

# Limited Warranty

Halogen Systems warrants its products to the original purchaser against any defects that are due to faulty material or workmanship for a period of one year from date of shipment unless otherwise noted in the product manual.

In the event that a defect is discovered during the warranty period, Halogen Systems agrees that, at its discretion, it will repair or replace the defective product or refund the purchase price excluding original shipping and handling charges. Any product repaired or replaced under this warranty will be warranted only for the remainder of the original product warranty period.

This warranty does not apply to consumable products such as chemical reagents; or consumable components of a product, such as, but not limited to, lamps and tubing.

Contact Halogen Systems or your distributor to initiate warranty support. Products may not be returned without authorization from Halogen Systems.

## Limitations

This warranty does not cover:

- Damage caused by acts of God, natural disasters, labor unrest, acts of war (declared or undeclared), terrorism, civil strife, or acts of any governmental jurisdiction
- Damage caused by misuse, neglect, accident, or improper application or installation
- Damage caused by any repair or attempted repair not authorized by the Halogen Systems
- Any product not used in accordance with the instructions furnished by the Halogen Systems
- Freight charges to return merchandise to the Halogen Systems
- Freight charges on expedited or express shipment of warranted parts or products
- Travel fees associated with on-site warranty repair

This warranty contains the sole express warranty made by Halogen Systems in connection with its products. All implied warranties, including, without limitation, the warranties of merchantability and fitness for a particular purpose, are expressly disclaimed.

Some states within the United States do not allow the disclaimer of implied warranties, and if this is true in your state, the above limitation may not apply to you. This warranty gives you specific rights, and you may also have other rights that vary from state to state.

This warranty constitutes the final, complete, and exclusive statement of warranty terms, and no person is authorized to make any other warranties or representations on behalf of Halogen Systems.

## Limitation of Remedies

The remedies of repair, replacement, or refund of the purchase price as stated above, are the exclusive remedies for the breach of this warranty. On the basis of strict liability or under any other legal theory, in no event shall Halogen Systems be liable for any incidental or consequential damages of any kind for breach of warranty or negligence.

Subject to all terms and conditions [www.halogensys.com/information](http://www.halogensys.com/information).

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