

Hellan Strainer

Installation & Operations Manual **Hellan Strainer Automatic Self-Cleaning Strainers**

**Models: DA, TSA, AA, QA, HA, WSA,
 WDA**

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SECTION 1.0 - WARRANTY

Product Warranty Limitation. Seller warrants (a) that the Products will conform (subject to industry variations) to the descriptions provided by Seller, on the face hereof and to the written specifications, if any, furnished by Buyer and accepted by Seller, (b) that Seller will convey good title to the Products free from any lawful security interest or other lien or encumbrance unknown to Buyer and arising through Seller and (c) that the Products will remain free of defects in material and workmanship for one year from the date of tender of delivery, provided that the Products are properly stored, handled and cared for, installed in accordance with sound engineering practice, properly operated under normal conditions, with competent supervision, maintained in compliance with Seller's maintenance recommendations (if applicable) and not subjected to alteration, accident, damage, wear and tear beyond tolerances, abuse, misuse or misapplication. Seller's obligations under this Warranty shall be conditioned upon Buyer's notifying Seller of any alleged defect(s) promptly after discovery and upon Seller satisfying itself upon inspection that its Warranty has been breached. At Seller's request, Buyer shall make each allegedly defective Product available for Seller's inspection or shall, if so directed by Seller, return each such Product to the plant. In the event of any breach of warranty hereunder, Seller shall repair or replace the defective Product at Seller's expense other than freight both ways which must be prepaid by Buyer, except that in lieu of repairing or replacing as aforesaid, Seller may elect to discharge its obligation to Buyer by crediting Buyer's account in a reasonable amount on account of the defect but in no event in an amount greater than the paid purchase price of the defective Product. THE OBLIGATIONS SET FORTH IN THE PRECEDING SENTENCE ARE SELLER'S SOLE OBLIGATIONS AND BUYER'S EXCLUSIVE REMEDY. SELLER MAKES NO OTHER WARRANTY, IMPLIED OR

EXPRESS, AND NO WARRANTY OR MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE. ANY BUYER OR USER'S SOLE REMEDY IN EVENT OF BREACH OF THE WARRANTIES WHICH ARE MADE BY SELLER IS REPLACEMENT OF THE GOODS F.O.B. SELLER'S PLACE OF BUSINESS OR CREDIT AS SET FORTH HEREIN; WITH THIS SOLE EXCEPTION, SELLER SHALL NOT BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, AND ANY BUYER OR USER HEREBY WAIVES FOR ITSELF AND ITS SUCCESSORS AND ASSIGNS (A) ANY AND ALL CLAIMS FOR PUNITIVE DAMAGES AND (B) ALL CLAIMS OF NEGLIGENCE OR STRICT LIABILITY OR BOTH. IN **NO** EVENT WILL SELLER'S LIABILITY EXCEED THE PURCHASE PRICE OF THE GOODS WHICH IS ACTUALLY PAID TO SELLER.

Buyer (a) recognizes that the provisions of this Warranty and Limitation are a material factor in Seller's sale of the Products at the price specified, and (b) agrees that any accommodation to Buyer by Seller, whether for sales policy reasons or otherwise, shall not be taken to establish any liability of Seller or any contract term inconsistent herewith. Seller's warranties are given only to purchasers who buy for resale or for industrial or commercial use. **Product Defect Notification.** Buyer shall notify Seller within a reasonable period of time, not to exceed 30 days, of any claim (made known to Seller) of any person that any Product was defective or caused injury to person or property. In the event that recovery is sought from Seller, Buyer shall indemnify and hold Seller harmless from any claim, judgment or settlement for any injuries resulting from the Product(s) being improperly stored, handled and cared for, installed not in accordance with sound engineering practices and safety practices, improperly operated, operated without competent supervision, maintained not in compliance with Seller's recommendations (if applicable), altered, damaged, abused, misused, misapplied, or used when tolerances are no longer maintained.

Returns. No products shall be returned to Seller, whether for inspection, repair, replacement or any other reason, without prior written consent from an authorized individual at Seller's Plant, district office or representative.

Modification; Waiver. This order may not be modified except by an instrument in writing signed by authorized employees of Buyer and Seller expressly referring hereto. No waiver by Seller of any breach of any provision hereof will constitute a waiver of any other breach of such or any other provision.

Applicable Law. The local laws of the State of Ohio shall apply to define and interpret the rights and obligations of Buyer and Seller. Buyer and Seller consent to the jurisdiction of the courts of the State of Ohio and to venue in Cuyahoga County.

SECTION 2.0 – INSTALLATION

2.1 Pre-Installation Checks

- 2.1.1 Upon receipt of equipment, inspect all components for obvious signs of physical damage. Report any/all damage to the carrier that delivered the equipment and notify Hellan Strainer by calling Customer Service at 1-888-4HELLAN (1-888-443-5526)
- 2.1.2 Remove shipping covers and any foreign material in the inlet, outlet, and drain openings of the strainer before installation.
- 2.1.3 Check nameplate attached to strainer body to determine the size, type, and screen perforations. All data on this nameplate should be included in any future inquiry concerning this strainer.
- 2.1.4 Reference the Caution Tag attached to the strainer unit for safety instructions and warnings.

2.2 Strainer Orientation

- 2.2.1 Proper pipe support must be provided on both sides of the strainer in accordance with all local plumbing codes.
- 2.2.2 The strainer casting or weldment includes a flow arrow showing the direction of flow through the strainer.
- 2.2.3 The Hellan Strainer must be installed as follows:
 - 2.2.3.1 Type TSA, WSA, and WDA **must** be installed in the horizontal flow position.
 - 2.2.3.2 Type AA **must** be installed in the vertical down-flow position.
 - 2.2.3.3 Type DA can be installed in either the vertical up-flow or horizontal flow positions.
 - 2.2.3.4 Types QA and HA **must** be installed in the vertical up-flow position.

2.3 Drain/Flush Line

- 2.3.1 For horizontal flow, the drain line **must** be installed in a downward position to allow gravity to aid the removal of solids, or the drain line will become clogged.
- 2.3.2 For vertical flow, the drain line may be installed in either direction parallel to the floor.
- 2.3.3 The flush valve may be installed up to five feet away from the strainer body.

2.4 Electrical

A wall mount NEMA electrical enclosure must be used as part of the strainer system. Installation must be in accordance with all local electric codes.

2.4.1 Motor Rotation

The screen motor must be wired so that the screen rotates in the proper direction. It is important to ensure that the solids are removed from the screen during the cleaning cycle. Check the rotation of the screen motor. The proper rotation is as follows:

2.4.1.1 The screen spins clockwise, for all types except WDA, when viewed from the shaft end of the screen, looking down on the strainer. For WDA style, one screen rotates counterclockwise and one screen rotates clockwise. Reference rotational markings or sticker for screen rotation.

2.4.1.2 Remove inspection cover to verify screen rotation after motor wiring.

SECTION 3.0 – ELECTRIC CONTROL PANEL (ECP)

3.1 Electric Control Panel & Electric Components (If Applicable)

The control panel and motorized valve package is designed to monitor the differential pressure across the strainer inlet/outlet and to initiate/control the cleaning cycle.

3.1.1 Hand/Off/Automatic (H-O-A) Rotary Selector Switch

This switch controls/initiates both the Flush Valve and the Screen Drive Motor.

3.1.1.1 HAND

Momentary contacts which will open the drain valve and run the screen drives. Upon release of the switch, it returns to off, the drain valve closes, and the screen drive stops.

NOTE: The HOA switch is spring loaded and should return to the OFF position when released.

3.1.1.2 OFF

In the OFF position, the power is interrupted to both the Flush Valve and the Screen Drive Motor. The control panel remains powered, but the cleaning operation is disabled.

NOTE: If service is to be performed on any electrical components, the main disconnect located on the control panel MUST be turned off.

3.1.1.3 AUTOMATIC

In the AUTOMATIC position the strainer cleaning cycle is automatically initiated by the differential pressure (DP) switch. When the DP exceeds the set point (factory set at 4 psi) the strainer will initiate a cleaning cycle.

The control panel will perform one cleaning cycle upon closure of an initiation switch. There are three methods of initiating a cycle:

Differential Pressure Switch – As the screen clogs, the pressure drop will rise. At a pre-set point, a cleaning cycle will start.

Interval Timer – The interval between cleaning cycles can be set from 0 to 99 hours 59 minutes. Factory recommended minimum is 5 minutes. The elapsed time is reset to zero if a cleaning cycle is started by any method or if the H-O-A switch is turned to off then back to automatic.

NOTE: There is a time delay before accepting the next cycle start, which allows the fluid turbulence to subside. This turbulence may otherwise cause the differential pressure switch to trigger unnecessary cleaning cycles.

Manual Cycle Start – This is a momentary push-button that will initiate a cleaning cycle.

3.1.2 Indicating Lights

Power On - Panel light is energized indicating the ECP has active power.

Cleaning Cycle in Progress- Panel indicator light energizes when a cleaning cycle is active.

High Pressure Alarm -If the strainer does not clean properly, the pressure drop will continue to build until the alarm lights. This light is energized when the pressure drop across the strainer exceeds a maximum value (factory set at 8 psi). If this occurs there is an unusual problem that must be corrected (see Troubleshooting; Section 6.0).

Note: The alarm is self-resetting when the differential pressure drop lowers below the set point. Auxiliary contacts in the control panel can be attached to a remote alarm.

3.2 Programmable Logic Controller (PLC) – Allen Bradley PICO

An Allen Bradley PICO Programmable Logic Controller (PLC) is used to control cleaning cycle parameters including all timer values. The timer values control the following parameters:

<u>Timer</u>	<u>Variable</u>
T-1	Controls screen cleaning time (Factory set at 15 seconds)
T-2	Time delay from end of cleaning cycle until all values are reset (Factory set at 45 seconds)
T-3	Default timer to initiate automatic cleaning cycle if high DP is not detected (Factory set at 24 hours)

NOTE: T-2 is utilized as a safe-guard to prevent the strainer from back-to-back cleaning cycles. It is normal for the differential pressure to fluctuate slightly upon the completion of a cleaning cycle when the Flush/Drain Valve closes. To prevent this, the T-2 timer is used to lock-out (delay) the DP signal from controlling the cleaning cycle until this default time has expired. Upon expiration of the T-2 timer the PLC will initiate a cleaning cycle either when the DP set point is triggered or when the default timer (T-3) has timed-out.

The procedure for adjusting the timer values is as follows:

- 3.2.1** Press the 'OK' button. This brings up the next screen. The cursor should be flashing on the word 'PROGRAM'.
- 3.2.2** Arrow down to 'Parameter' using the center rocker switch. The cursor should be flashing on the word 'Parameter'.
- 3.2.3** Press the 'OK' button; this brings up the next screen which is a list of all adjustable timers.
- 3.2.4** To change T-1, first confirm that the cursor is blinking on the 'T' of T-1 and then press 'OK'. This brings up a screen that lists the rungs where the timer is used. With the cursor blinking on the first digit press 'OK'. Then use the up/down arrows to change that digit or the right/left arrow to change other digits. When done setting values press 'OK'.
- 3.2.5** Press 'ESC'. This will bring you back to the list of adjustable timers.
- 3.2.6** Use the Up/Down arrows to move to the other timers and follow steps 4 & 5 (above).
- 3.2.7** Press 'ESC' two (2) times to return to the main menu.

3.3 Differential Pressure Switch (Mid-West Instruments) (If Applicable)

The Differential Pressure (DP) switch includes two set points that are factory set as follows:

- P1: The P1 set point is factory set at 4.0 psi. This set point automatically initiates a cleaning cycle.
- P2: The P2 set point is factory set at 8.0 psi. This set point activates the 'HIGH PRESSURE' alarm.

3.3.1 Set Point Adjustment Procedure

The factory set points rarely need to be adjusted; however, if adjustments are necessary the procedure is as follows:

3.3.1.1 Cleaning Cycle Pressure (P1)

The cleaning cycle pressure setting is factory set at 4 psi. Should this pressure need to be changed there is an adjustment screw located on the LEFT side of the device.

To adjust the 'CLEANING CYCLE INITIATION' set point, remove the cover screw shown in the above photo. Beneath the cover screw is an adjustment screw with a regular (flat) screw driver.

To INCREASE the set point turn the screw COUNTERCLOCKWISE.

To DECREASE the set point turn the screw CLOCKWISE.

Adjusting the set point to a specific value must be accomplished utilizing a trial-and-error method.

NOTE: Do NOT use a magnetized screw driver to adjust the setting as this will affect the calibration.

3.3.1.2 High Pressure (P2)

The cleaning cycle pressure is factory set at 8 psi. Should this pressure need to be changed there is an adjustment screw located on the RIGHT side of the device.

To adjust the 'HIGH PRESSURE' set point, remove the cover screw. Beneath the cover screw is an adjustment screw with a regular (flat) screw driver.

To INCREASE the set point turn the screw CLOCKWISE.

To DECREASE the set point turn the screw COUNTERCLOCKWISE.

Adjusting the set point to a specific value must be accomplished utilizing a trial-and-error method.

NOTE: Do NOT use a magnetized screw driver to adjust the setting as this will affect the calibration.

SECTION 4.0 – START-UP & OPERATING INSTRUCTIONS

- 4.1 Perform a static inspection of equipment checking all fasteners, tubing, wiring, etc.
- 4.2 Non-pressurized operational inspection is checked by turning the HAND/OFF/AUTO switch to the 'HAND' position.
 - 4.2.1 Confirm that motors are rotating correctly (see 2.5.1)
 - 4.2.2 Confirm the Flush/Drain Valve actuator opens the ball valve ¼ turn (90 degrees).
 - 4.2.3 Confirm the Flush/Drain Valve returns to the closed position when the HAND/OFF/AUTO switch is released.

NOTE: The HOA switch is spring loaded and should return to the OFF position when released.
- 4.3 Pressurize the system and check for water leaks.
- 4.4 Pressurized Operational Verification
 - 4.4.1 Verify the Screen Drive Motor and the Flush/Drain Valve are operational.
 - 4.4.2 Manually activate a cleaning cycle by pushing the 'CYCLE START' button.

NOTE: The 'CYCLE START' button is a momentary activation and it is not necessary to hold the button. The Cleaning Cycle should start immediately upon pushing this button.
 - 4.4.3 Manually check the cleaning cycle time value to verify the factory setting. The cleaning cycle is factory programmed to clean for 15 seconds, and reset after 45 seconds. During this time the screen drive motors should be activated and the Flush/Drain Valve should be in the open position.
 - 4.4.4 Check the default cleaning cycle timer. The default timer will automatically initiate a cleaning cycle if the system does not detect a high differential pressure within a set time. The default factory setting is 24 hours. To verify the PLC timer is functioning, temporarily re-set the timer value to 3 minutes (see adjustment procedure in Section 5.5). Verify a cleaning cycle is automatically initiated at 3 minutes.

NOTE: Re-set the default timer to 24 hours after completing this system check. Failure to do so will result in excessive cleaning cycles which will produce a lot of unnecessary waste.

SECTION 5.0 – PREVENTATIVE MAINTENANCE INSTRUCTIONS

5.1 Maintenance Instructions

SAFETY NOTE:

Prior to any maintenance being carried out, the strainer must be isolated from all flow, residual pressure must be vented, and electrical power must be turned OFF.

- 5.1.1 At least once a year, inspect the screens & scraper brushes/bars via the inspection ports.
- 5.1.2 Rotate the screens to ensure there is no binding between the screen & scraper.

5.2 Idle Periods Exercising Instructions

Perform a cleaning cycle at least once every month during idle periods.
It is not necessary for the strainer to be filled with water before initiating a test cleaning cycle.

5.3 O-Ring Seal Replacement

Whenever O-ring seals are disassembled, a hydrocarbon lubricant should be used before reassembly of the seal. Contact factory for O-ring kits.

5.4 Periodic Inspections

Periodically, the screen and scraper brush/bar assemblies should be inspected for damage. Any damaged item should be replaced. Inspection of the screen and scraper brush/bar assemblies is accomplished by removing the inspection cover plate located on the body directly above each screen assembly. The O-ring seals should be inspected and replaced if necessary. Replacement of both the scraper brush/bar and screen assembly is performed by removing the screen assembly cover plates. If a new screen assembly and/or scraper brush/bar is installed, the scraper brush/bar adjustment procedure is as follows.

- 5.4.1 Vent and drain the strainer cavity
- 5.4.2 Remove the inspection cover plates
- 5.4.3 Loosen the scraper brush/bar mounting bolts
- 5.4.4 With the screen in position: For wedge wire screens, lower the scraper brush until it is in contact with the screen. For perforated screens, lower the scraper bar until there is a distance of .005” between the screen and scraper.
- 5.4.5 Clamp the scraper brush/bar in place by tightening bolts
- 5.4.6 Rotate the screen and check that it does not bind
- 5.4.7 Re-install the inspection cover plate
- 5.4.8 Open the isolation valves and restart the fluid flow for the strainer

SECTION 6.0- TROUBLESHOOTING & DISASSEMBLY INSTRUCTIONS

6.1 Strainer

If the strainer fails to clean and the pressure drop across the strainer exceeds the normal operating parameters, check the following:

- 6.1.1 Power supply
- 6.1.2 Electrical connections
- 6.1.3 Pressure differential switch settings
- 6.1.4 Foreign obstruction inside the strainer
- 6.1.5 Drain valve operation
- 6.1.6 Scraper bar assembly adjustment
- 6.1.7 Condition of screen assemblies
- 6.1.8 Gearbox lubrication and operation

Correct the problem(s) and perform the startup procedures described in Section 4.0

6.2 Screen Drive Motor / Assemblies

The motorized drive assembly (adapter bracket, gear box & drive motor) can be removed easily to provide access to the interior of the strainer.

The procedure to remove the motorized screen drive assembly is as follows:

- 6.2.1 Disconnect electrical power
- 6.2.2 Isolate the strainer and relieve system pressure
- 6.2.3 Remove the bolts attaching the gearbox adapter to the strainer body
- 6.2.4 Remove motor, gearbox, and adapter as an assembly by sliding it off the shaft
- 6.2.5 Remove the remaining cover plate bolts and remove the cover plate, shaft, and screen assembly by sliding them as a unit from the strainer body.

6.3 Screen Replacement

To replace the screen assembly after removing the motorized screen drive assembly:

- 6.3.1 Remove the nut holding the screen assembly on the shaft and remove the screen.
- 6.3.2 Slide the new screen assembly over the shaft, making certain the key on the shaft engages the keyway in the hub of the screen assembly.
- 6.3.3 Install a new o-ring on the cover plate.

NOTE: Whenever o-ring seals are disassembled, a hydrocarbon lubricant should be used before reassembly of the seal. Contact factory for O-ring kits.

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- 6.3.4** Install the cover plate, shaft and screen assembly as a unit into the strainer body and fasten with the shorter bolts previously removed.
- 6.3.5** Rotate the screen by hand using a crescent wrench over the key. Check for leaks after pressurizing.
- 6.3.6** Coat the end of the shaft with anti-seize compound.
- 6.3.7** Slide the gear box assembly over the screen shaft, making certain the key on the shaft engages the keyway in the gearbox.
- 6.3.8** Fasten the gearbox adapter flange with the longer bolts, making certain the gearbox key engages the motor key slot.
- 6.3.9** Complete the electrical connections.