HY-MAG

Electromagnetic Physical Water Conditioner

Type: DN65

The HY-MAG

Our **HY-MAG** electromagnetic water conditioner uses the application of physical forces to induce the nucleation of calcium carbonate in solution, in doing so creating microcrystals that act as nucleation sites for further calcium carbonate crystallization in areas of heat transfer.

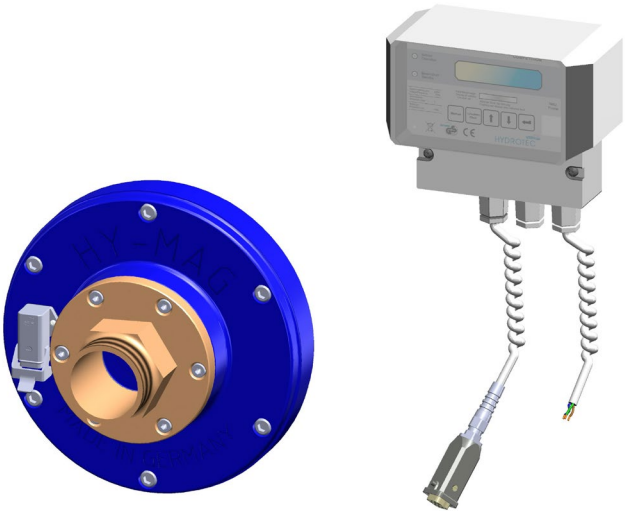
The **HY-MAG** is unique in several ways,
1) the device deploys an internal diffuser plate that manipulates water flow across the fields of force at 90° maximizing the effect of the 2500 gauss force available
2) The device is plasma coated with PTFE to prevent deposition and minimize frictional losses
3) The HY-MAG provides a patented reverse polarity function, this result in the poles of the electromagnetic solenoid alternating repelling any attracted debris or ferrous material

The Design

The **HY-MAG** consists of a PTFE coated cast iron precision engineered water treatment unit. Within the device is an electromagnetic solenoid and internal diffuser plate that together ensure the maximum amount of available force is utilized providing unparallel levels of physical water conditioning

The **HY-MAG DN65** is supplied with BSP threaded male and female connections.

The **HY-MAG** can be supplied with several control options (see overleaf)



HY-MAG shown with Competition Control Box

Key Benefits

- 48 hour period of conditioning retention
- Highly Effective When Correctly Deployed
- Fully WRAS Approved
- Easy to install and operate
- Low energy use
- Water Quality is Unaffected
- No Replacement/Consumable components/electrode
- Low-no maintenance required

Links to Additional Information

- Verified EPD
- BIM Model (2019)
- WRAS Directory Listing

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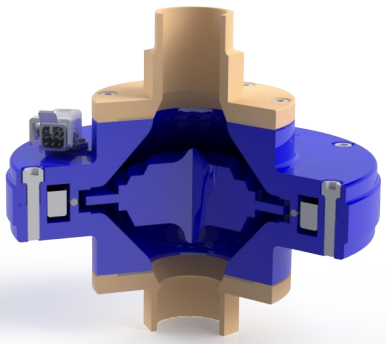
Control Options

1) Competition – This controller provides visual indication of operation via LCD display and is supplied with a NO/NC volt free connection for general fault output

2) Integral – This controller provides visual indication of operation via TFT LCD display and is supplied with NO/NC volt free connection for general fault output, additionally this controller allows for connection to a contact water meter to facilitate proportional conditioning providing reduced energy consumption

3) Integral Pro – This controller provides visual indication of operation via TFT LCD display and is supplied with MODBUS activation for communication with MODBUS BMS, additionally this controller allows for connection to a contacting water meter to facilitate proportional conditioning providing reduced energy consumption

4) Integral Pro+ -This controller provides visual indication of operation via TFT LCD display and is supplied with MODBUS to BACnet TCP/IP for communication with BACnet BMS, additionally this controller allows for connection to a contact water meter to facilitate proportional conditioning providing reduced energy consumption



Cross Section of HY-MAG Device

Installation Notes

- The Water Treatment Unit must not be thermal insulated
- Where using metal to support the device, electrical insulation must be used between the support and the water treatment unit
- The installation site must be free from solvent, colorant, varnish and chemical vapours
- Flow directions at the input and output must be observed
- The unit shall have 500mm straight pipe upstream and downstream the device
- A single phase 240V mains connection should be provided to the unit controller
- Access should be available for servicing and maintenance
- Technical data and technical guidelines should be followed per the O&M manual and local regulations.
- LSI must be +ve at point of conditioning

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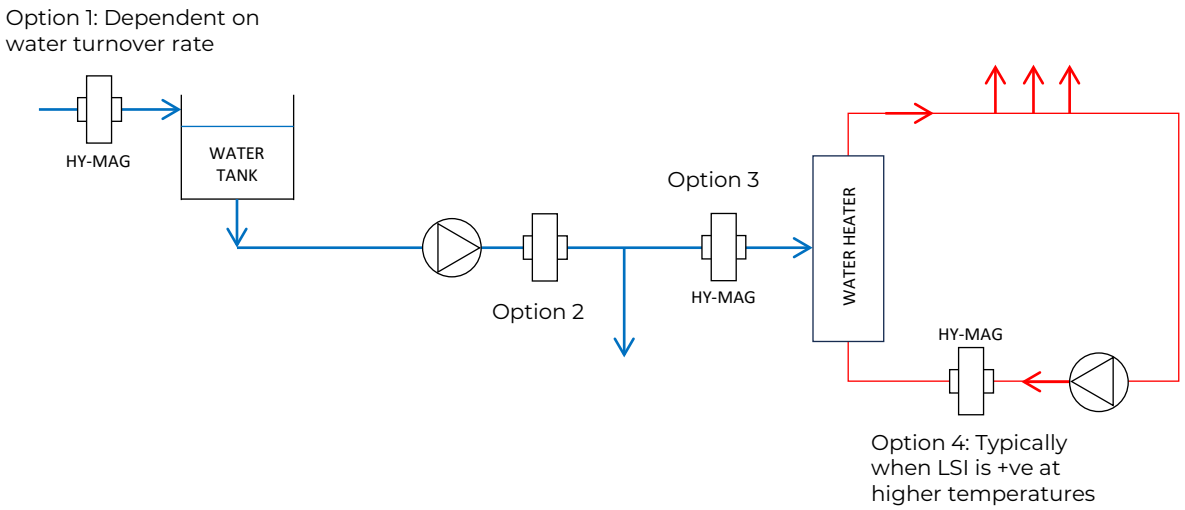

Note regarding water conditioning

A water conditioning device applies a temporary effect to the water by way of force induced nucleation of calcium carbonate, this mechanism is effective at preventing limescale deposition in domestic/sanitary hot water generation plant, it does not remove the hardness, due to this evaporative deposits will still present themselves where evaporation occurs, most notably on sanitaryware

It is for this reason also that water conditioners are not suitable for evaporative applications such as humidification, steam generation and cooling systems.

Where the removal of hardness is required a HydroION base exchange water softener can be considered

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Item	HY-MAG DN65
Approval	WRAS
Flowrate @ 50mbar ΔP	5.2 l/s (18.7m³/h)
Maximum inlet pressure	16 Bar
Max. water temperature	80°C
Max. ambient temperature	40°C
Connections	2 1/2" BSP
Field Line across water flow path	90 Degree
	+/-5 minutes
Magnetic flux density across water flow	2,500 Gauss
Effective conditioning treatment	48 Hours
Mechanism to eliminate routine maintenance	Reverse Polarity
Unit body for field conductance	Grey cast-iron to DIN 1691
Water Treatment Unit Dimensions	254x287mm
Finish	Internally and Externally plasma-coated with food grade Teflon
Electromagnetic coil	110V DC
Weight	26.5 kg
Power Supply	230V/1ph/50Hz
Maximum power consumption	76W
Enclosure protection	IP65
Control Box Options	For VFC Connection use the competition control box (IP65)
	For Proportional Conditioning use Integral Control Box(IP65)
	For MODBUS use Integral Pro Control Box(IP65)
	For BACnet use Integral Pro+ Control Box(IP65)

*The HY-MAG can operate at flow rates greater than detailed above

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ENVIRONMENTAL DATA SUMMARY	HY-MAG DN65 Electromagnetic Water Conditioning Unit
EPD Reference	EPD_Hydrotec_(UK)_Ltd_HY_MAG_DN65_Electromagnetic_Water_Conditioning_Unit_HUB-0741_2023-10-30
Declared unit	1 unit of water conditioning equipment
Declared unit mass	33 kg
GWP-fossil, A1-A3 (kgCO2e)	1.70E+02
GWP-total, A1-A3 (kgCO2e)	1.31E+02
Secondary material, inputs (%)	36
Secondary material, outputs (%)	49.4
Total energy use, A1-A3 (kWh)	732
Total water use, A1-A3 (m^3)	2.21E+00
PRODUCT RAW MATERIAL MAIN COMPOSITION	
Metals Amount, mass- %	96.69
Minerals Amount, mass- %	0
Fossil materials Amount, mass- %	3.31
Bio-based materials Amount, mass- %	0
BIOGENIC CARBON CONTENT	
Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	10.77
FUNCTIONAL UNIT AND SERVICE LIFE	
Declared unit	1 unit of water conditioning equipment
Mass per declared unit	33 kg
Functional unit	1 unit of water conditioning equipment operating at 0.076kW for 24 hours and 365 days a year.
Reference service life	25 years

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Specification Clause

HYMAG DN65 Electro-Magnetic Physical Water Conditioning

For the inhibition of hard limescale formation within domestic hot water generation plant the Mechanical Contractor shall supply and install a WRAS approved Electro-Magnetic Physical Water Conditioning device.
This design is based on the HY-MAG electro-magnetic physical water conditioner, model reference: HYMAG DN65 as manufactured by (contact sales@hydrotec.co.uk).

On appointment, the Mechanical Contractor shall liaise with the manufacturer in order to ascertain the most effective positioning of the Physical Water Conditioner on the H/CWS system, with consideration taken in regard to the domestic water services design and local water quality.

The device shall generally be in accordance with the following schedule:-

- Design Flow Rate (l/s):: 5.2
- Pressure loss (mbar): 50
- Power Supply : 230V/1ph/50Hz
- Connection Size (mm) : 2 1/2" BSP

The electromagnetic physical water conditioning unit shall strictly comprise the following features; 110V DC electric coil for generating sufficient magnetic field, a designed flow path that enables 100% of water to cross a magnetic field line at an angle of 90˚, an effective treatment period of minimum 48hrs and shall be externally / internally plasma coated with food grade Teflon."

The unit shall be installed complete with IP65 rated integral Control Box providing visual and textual indication of operation and health via touchscreen TFT LCD display. The control box is to be supplied with a NO/NC volt free contact for BMS connectivity. Additionally, The water conditioning device is to provide proportional conditioning to minimise energy use so is to be provided with a dedicated line sized contacting water meter or non-intrusive ultrasonic water meter to be installed immediately upstream the device.
The device shall include a polarity reversal facility to eliminate routine maintenance / foreign matter build up.

For the accurate monitoring of environmental impact, it is preferred that the manufacturer is able to provide a Verified EPD or alternatively a mid-level LCA in accordance with the TM65 Embodied Carbon Calculation Methodology.

The unit shall be installed in strict accordance with the manufacturer's literature.
Notes (key features):-

- WRAS Approved.
- 110V DC electric coil for generating magnetic field
- Specifically designed flow path enabling 100% treatment of water crossing a magnetic field line at an angle of 90˚.
- Reverse polarity facility in order to prevent foreign matter build up and eliminate routine maintenance.
- Minimum effective treatment period of 48hrs.
- Internally and externally plasma coated with food grade Teflon.

The recommended specification clauses above are intended to cover a wide variety of applications. We recommend speaking to a Hydrotec representative to produce project-specific tailored specifications.