

HydroXS
Product Catalog 2023

HYDROXS

CLEAN ENERGY. MANAGED PRESSURE.

InPipeEnergy.com

INPIPE[®]
ENERGY

Version 1.04/15/2023

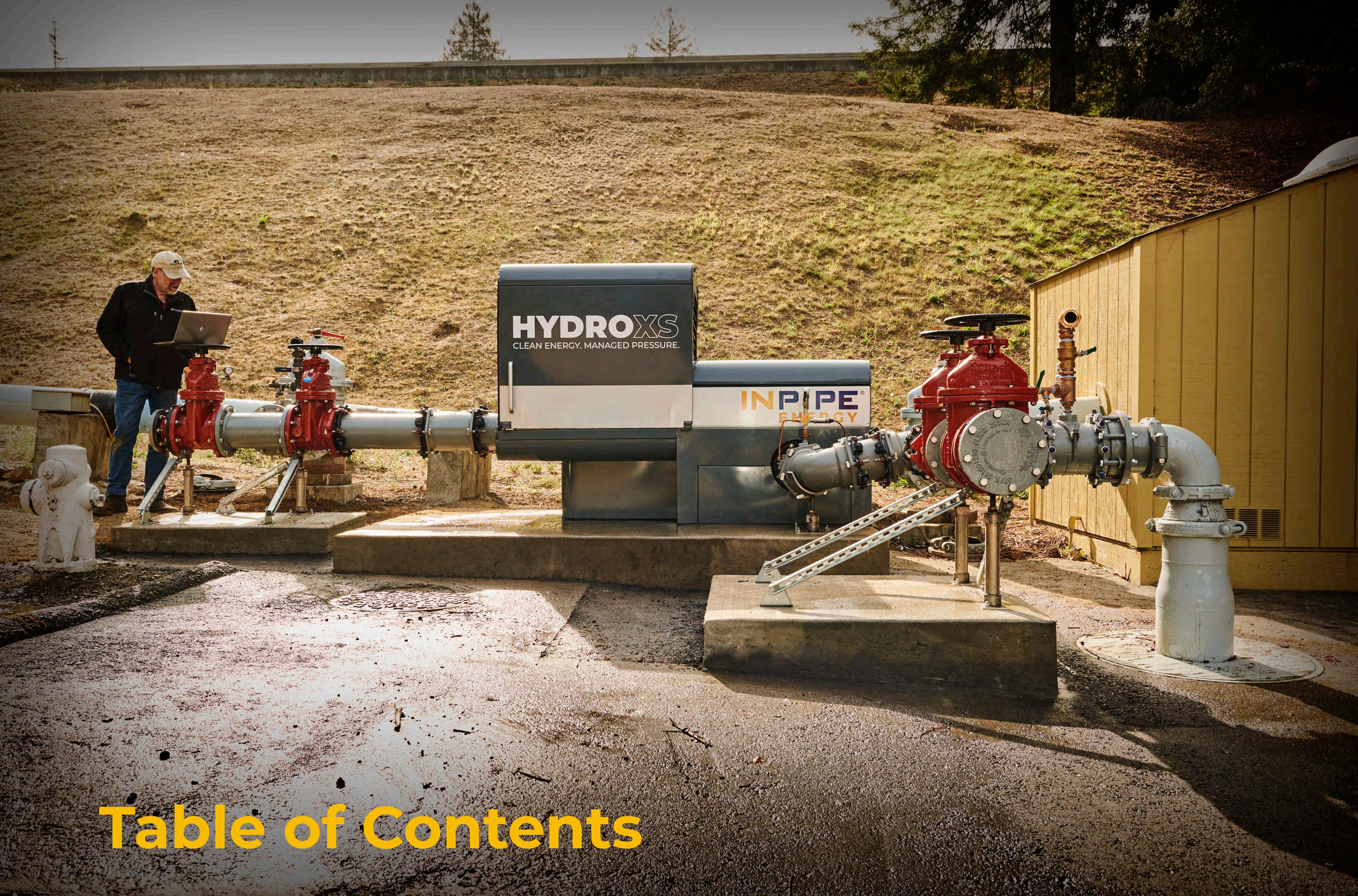


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COMPANY OVERVIEW

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InPipe Energy is focused on helping water and wastewater utilities address climate change by improving pressure management and flow control and creating new clean energy resources from pressurized water pipelines. Water and energy are inextricably linked. The treatment and delivery of water is energy intensive, which is getting more expensive and most of this energy comes from fossil fuels. In order to reduce the impact of rising energy costs and address climate and sustainability goals, many utilities are discovering the HydroXS as a solution for decarbonizing operations and reducing their costs for energy.

The HydroXS, energy recovery system, directly addresses the nexus of water and energy. The HydroXS replicates the functionality of a control valve, but instead of wasting potential energy, it converts differential pressure into clean, low cost, predictable and reliable electricity. This digitally enabled energy recovery system combines micro-hydropower technology with flow and pressure controls that are easily integrated into pressurized pipelines. When in place, the HydroXS produces energy to reduce operating costs, saves water, reduces carbon emissions and extends the life of their current infrastructure without changing operations.

The HydroXS also dynamically manages pressure, provides critical data and can help establish district metered areas (DMAs) all to reduce water loss. The HydroXS also includes a real-time dashboard to track and manage important operational, sustainability and water loss (NRW) data to improve operations.


InPipe Energy provides a completely turnkey process, including identifying state and federal funding sources, all to make it easy for water operators to install, operate and maintain the HydroXS to deliver a safe, clean, carbon free and reliable supply of water to their customers.

The following information is designed to provide technical specifications about the HydroXS to make it easy to integrate the HydroXS to decarbonize new and existing water infrastructure.

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SIZING GUIDE

The HydroXS is configured in seven sizes based on operational flowrate and associated pressure differential. This graph shows the relationship of the seven sizes to hydraulic conditions and power.



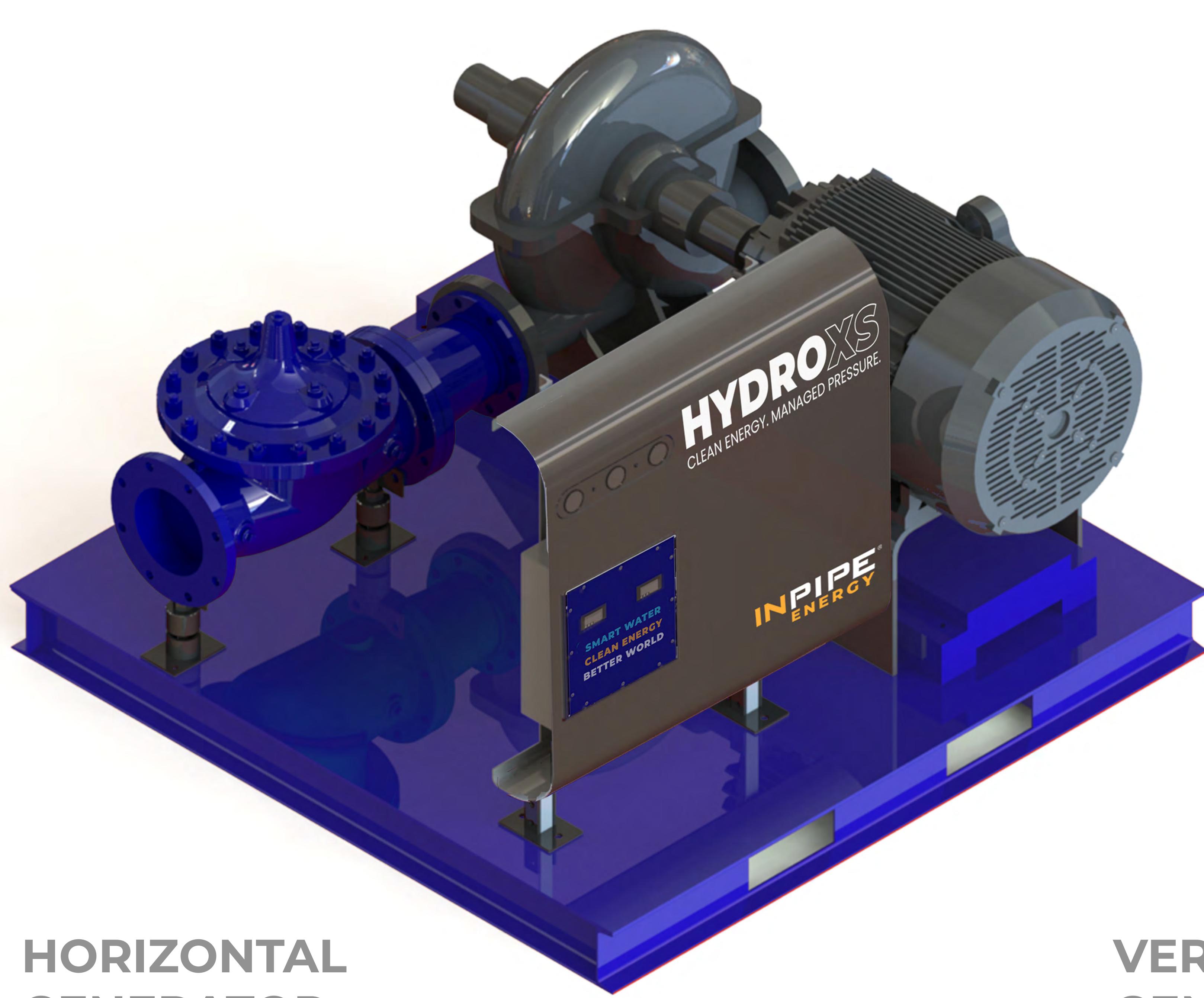
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HYDRAULIC PARAMETERS

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	Model Numbers						
	M2	M4	M8	M12	M16	M24	M36
Operational Parameters							
Max Design Flow (GPM/CFS)	100/.22	600/1.34	2,000/4.46	6,000/13.37	11,000/24.51	25,000/55.7	50,000/111.4
Max Power (KW)	10	50	200	350	600	1,000	2,000
Minimum Flow (GPM/CFS)	5/.01	10/.02	1/.002	3/.006	3/.006	10/.02	20/.04
Min Inlet Pressure (PSIG)	20	20	20	20	20	20	20
Max Inlet Pressure (PSIG)	450	450	350	300	300	250	200
Mechanical Parameters							
Suction Connection (in)	2	4	8	12	16	24	36
Discharge Connection (in)	2.5	4	8	12	16	24	36
Generator Configurations	Horizontal or Vertical	Horizontal or Vertical	Horizontal or Vertical	Horizontal or Vertical	Horizontal	Horizontal	Horizontal

This table shows the operational and mechanical parameters of the 7 sizes of the HydroXS systems.



HORIZONTAL
GENERATOR
CONFIGURATION



VERTICLE
GENERATOR
CONFIGURATION

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CONFIGURATIONS & SPECIFICATIONS

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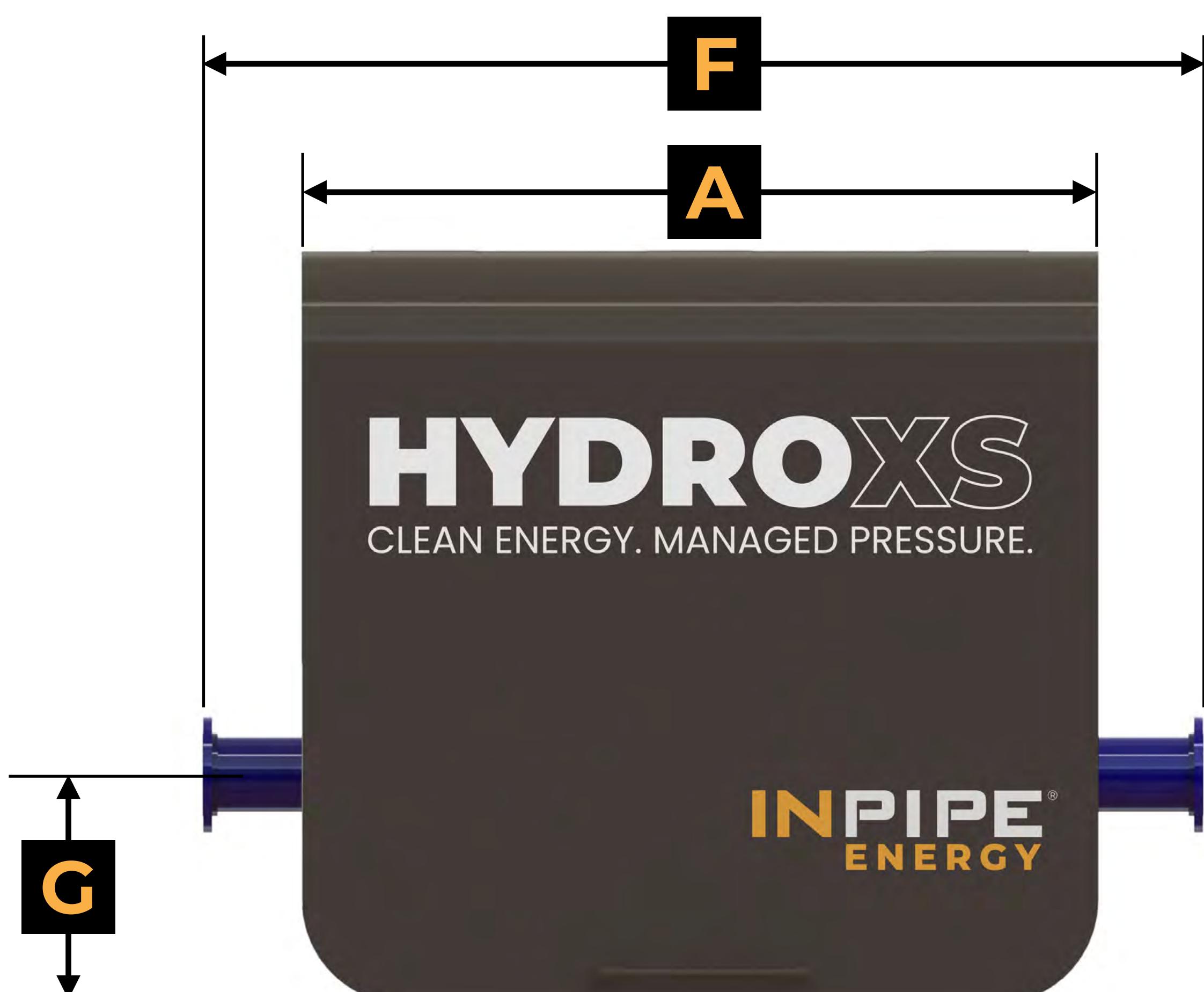
TOP VIEW



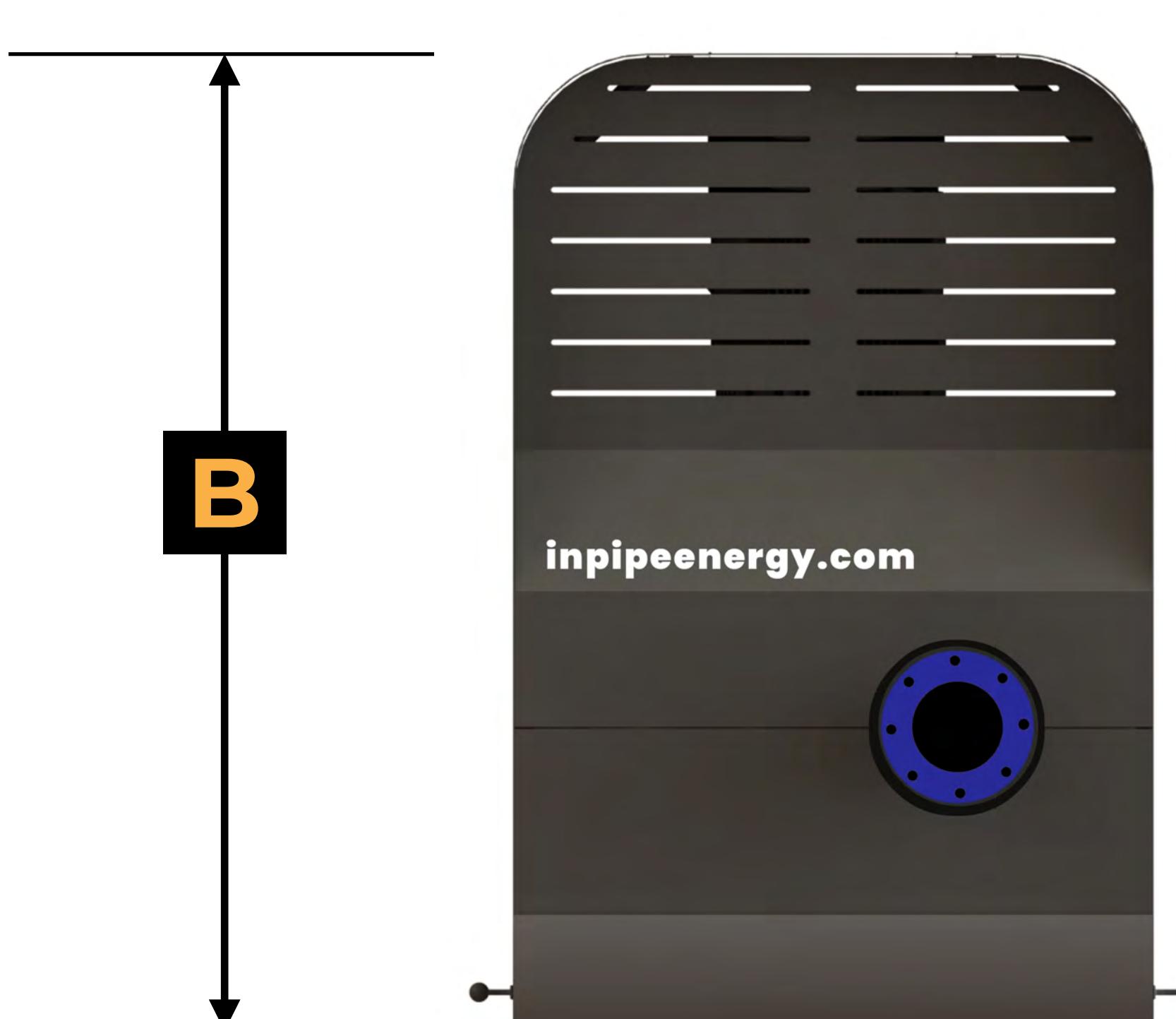
ISOMETRIC VIEW



FRONT VIEW



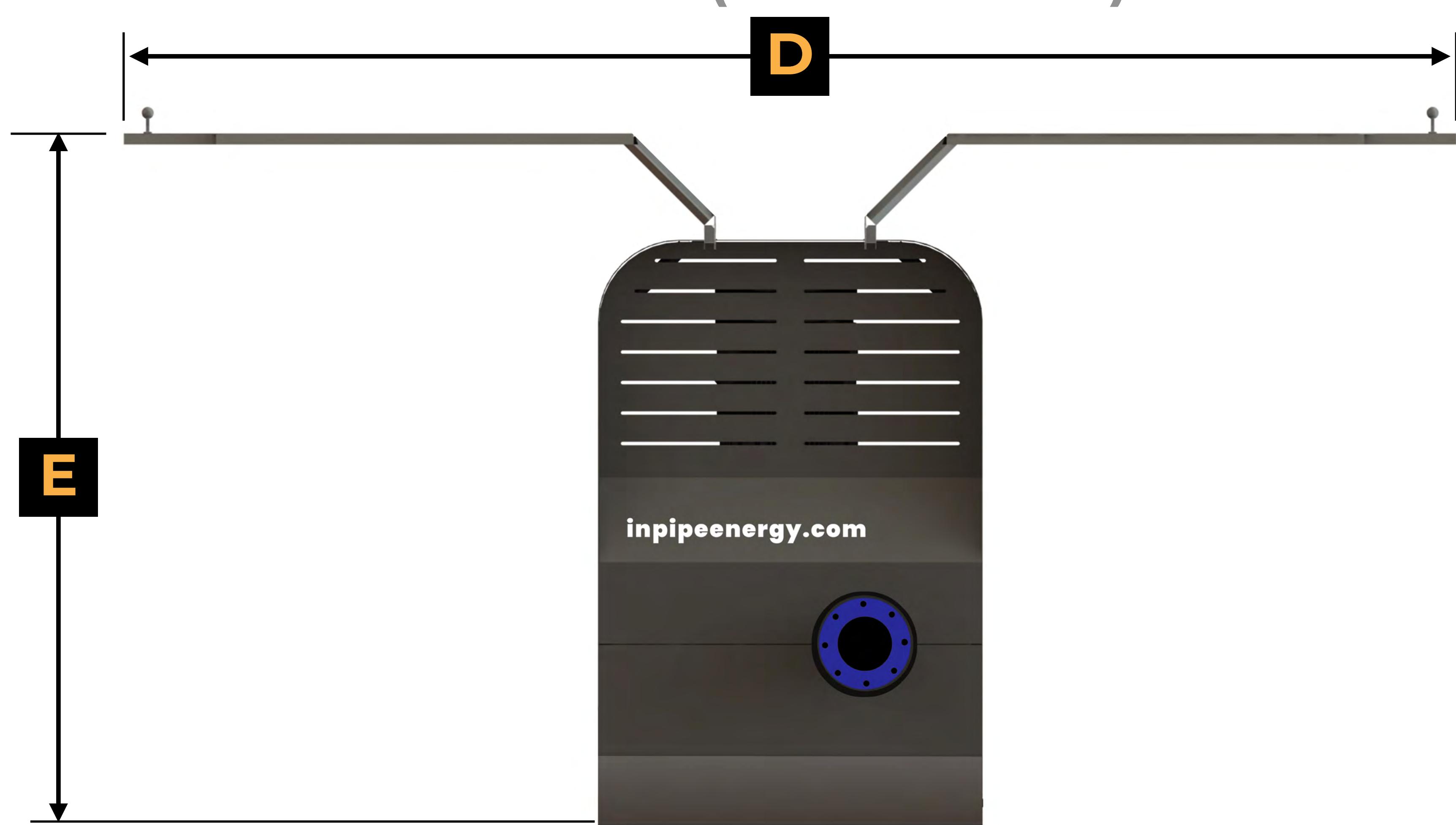
SIDE VIEW



FRONT VIEW (DOORS OPEN)



SIDE VIEW (DOORS OPEN)



Dimensions

	A		B		C		D		E		F		G		H		Total Weight (Enclosure + Skid)	
System Size	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
M2-V	1,524	60	2,235	88	1,321	52	4,907	193	2,680	106	1,549	61	457	18	267	11	673	1,483
M4-V	1,727	68	2,235	88	1,372	54	4,958	195	2,680	106	1,956	77	460	18	533	21	951	2,096
M8-V	2,305	91	2,235	88	1,448	57	5,034	198	2,680	106	2,940	116	673	27	457	18	2,488	5,484
M12-V	2,819	111	3,175	125	1,626	64	7,092	279	3,620	143	4,064	160	762	30	546	22	5,603	12,353
M2-H	1,524	60	2,235	88	1,321	52	4,907	193	2,680	106	1,549	61	343	14	305	12	797	1,758
M4-H	1,702	67	2,235	88	1,473	58	5,060	199	2,680	106	1,930	76	356	14	356	14	1,071	2,361
M8-H	2,337	92	2,235	88	2,032	80	5,618	221	2,680	106	2,972	117	495	20	508	20	2,773	6,114
M12-H	2,819	111	2,235	88	2,591	102	6,177	243	2,680	106	4,064	160	597	24	600	24	5,812	12,813
M16-H	3,708	146	2,235	88	3,302	130	6,888	271	2,680	106	5,258	207	699	28	686	27	9,404	20,732
M24-H	4,851	191	2,667	105	4,318	170	8,768	345	3,112	123	7,010	276	851	34	950	37	13,017	28,698
M36-H	6,274	247	3,099	122	4,928	194	10,241	403	3,543	140	9,347	368	1,003	40	1,245	49	20,545	45,294

This table shows the dimensions and weights of the enclosure

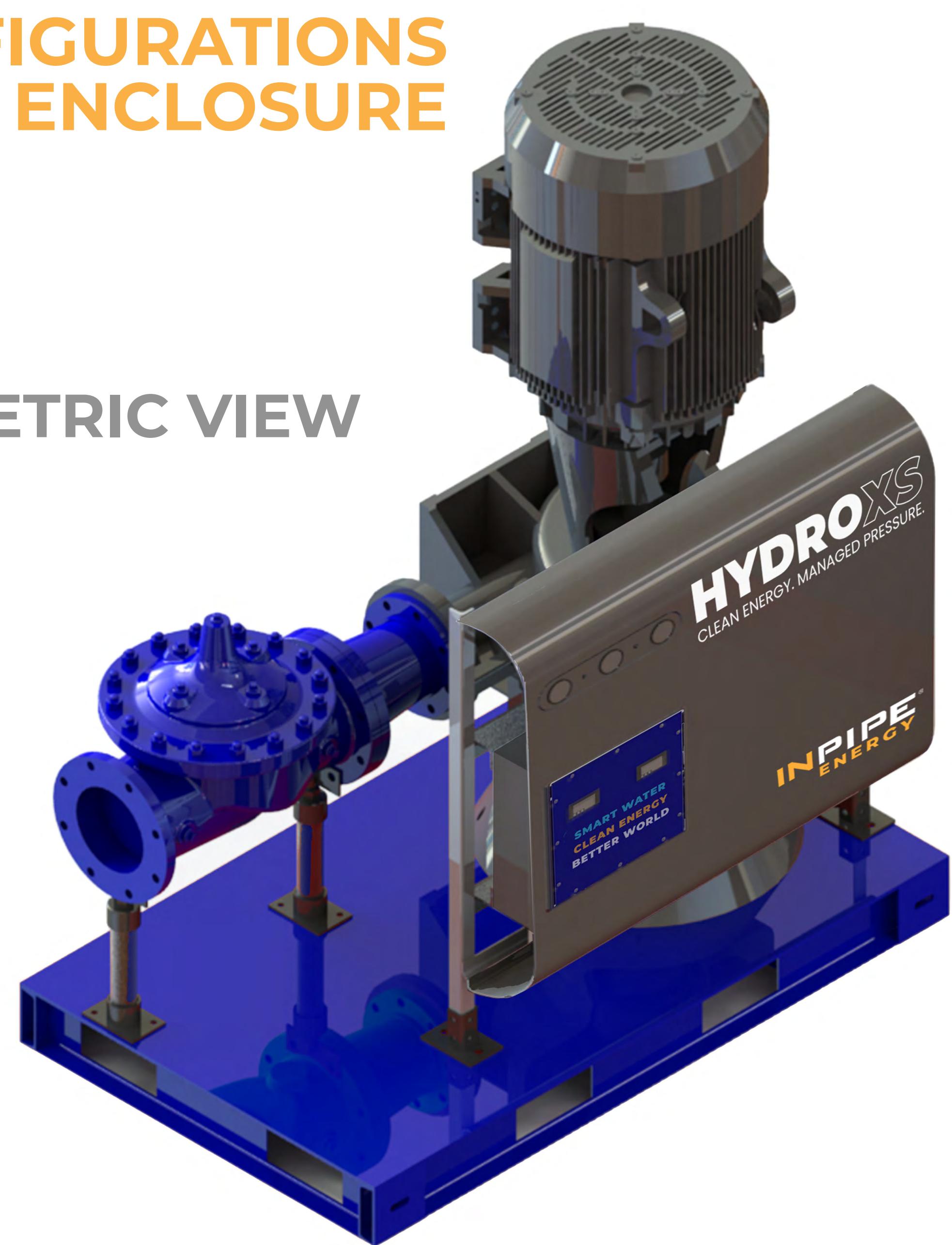
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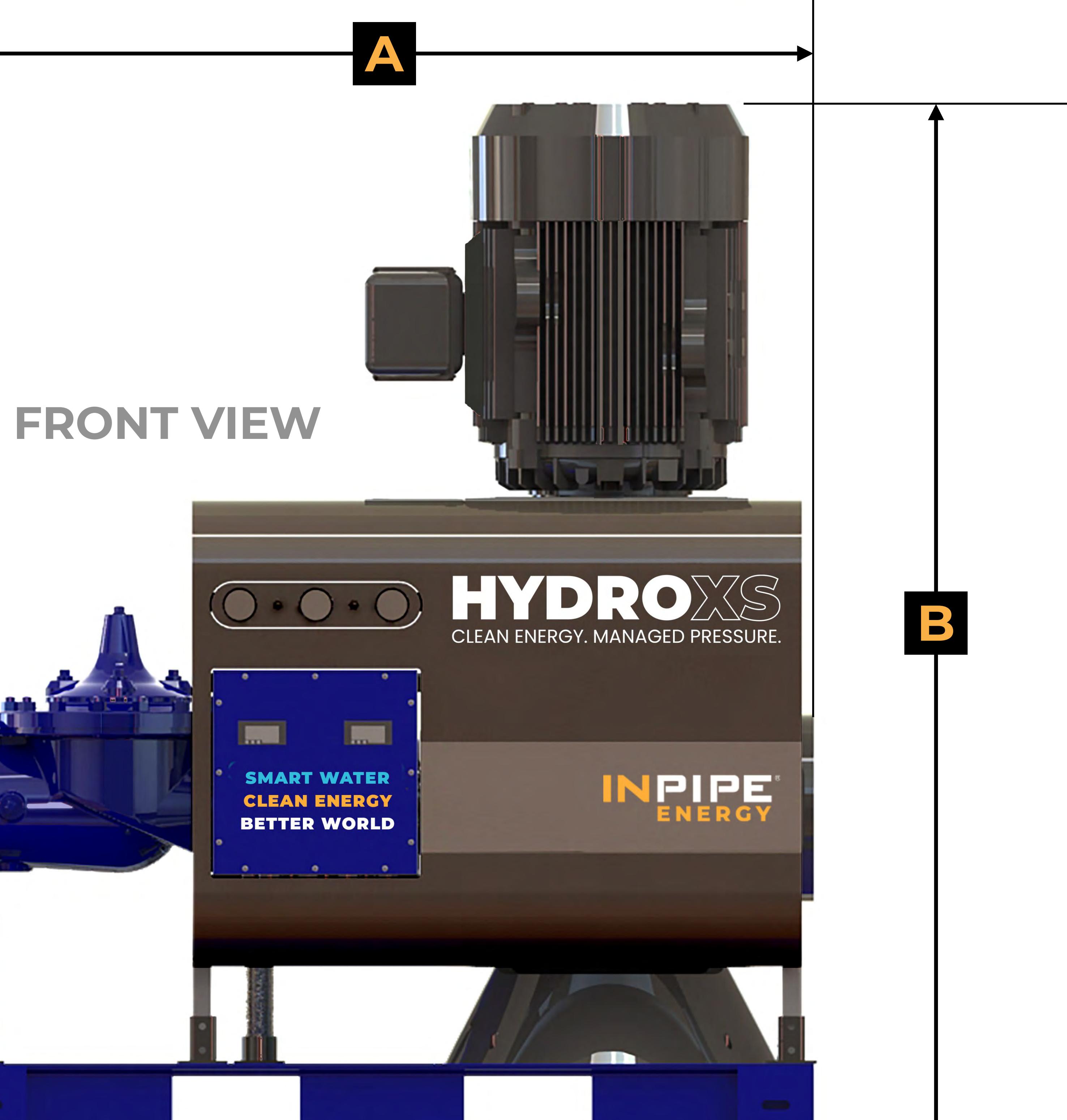
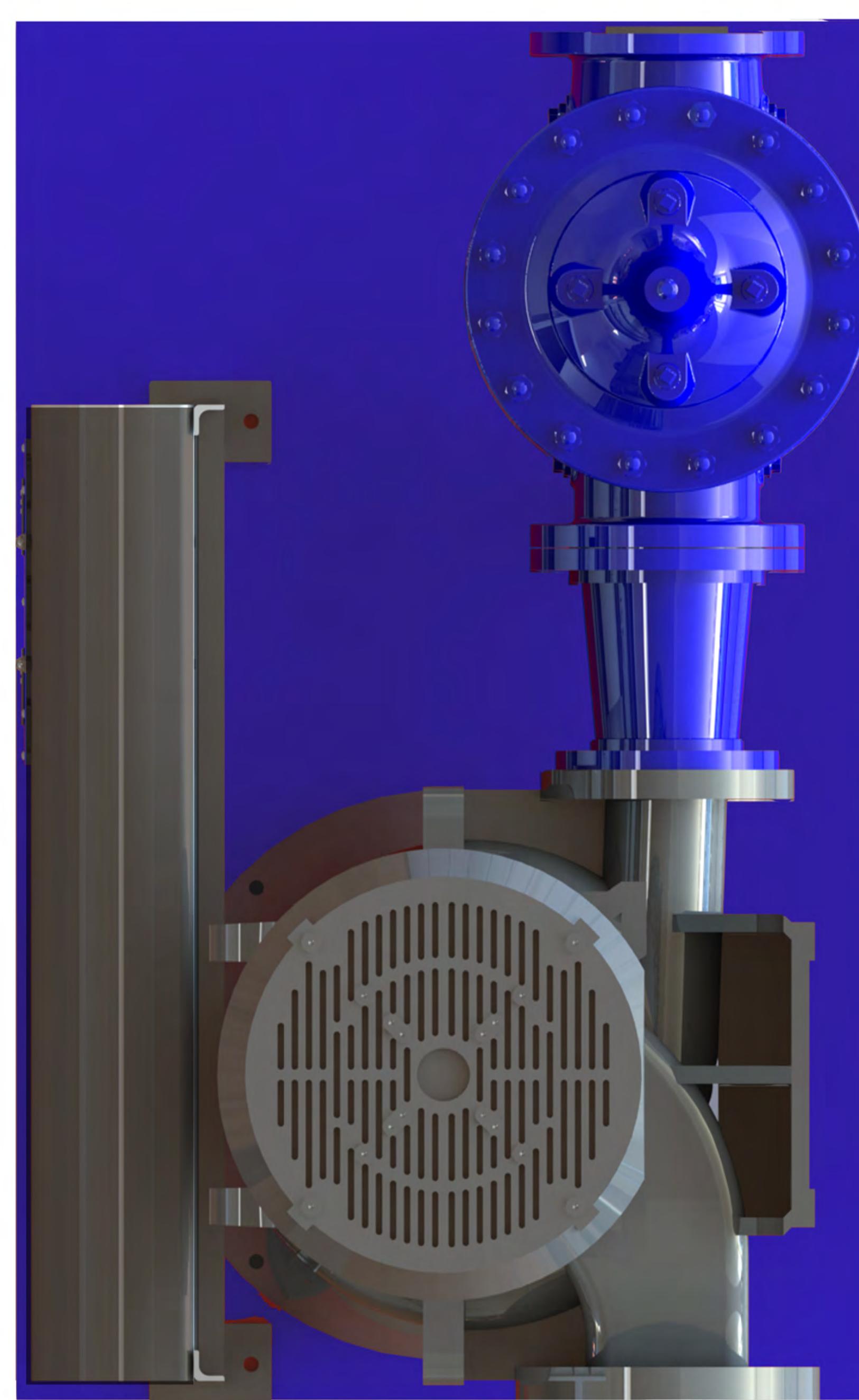
SMALL VERTICAL CONFIGURATIONS
WITHOUT ENCLOSURE

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ISOMETRIC VIEW

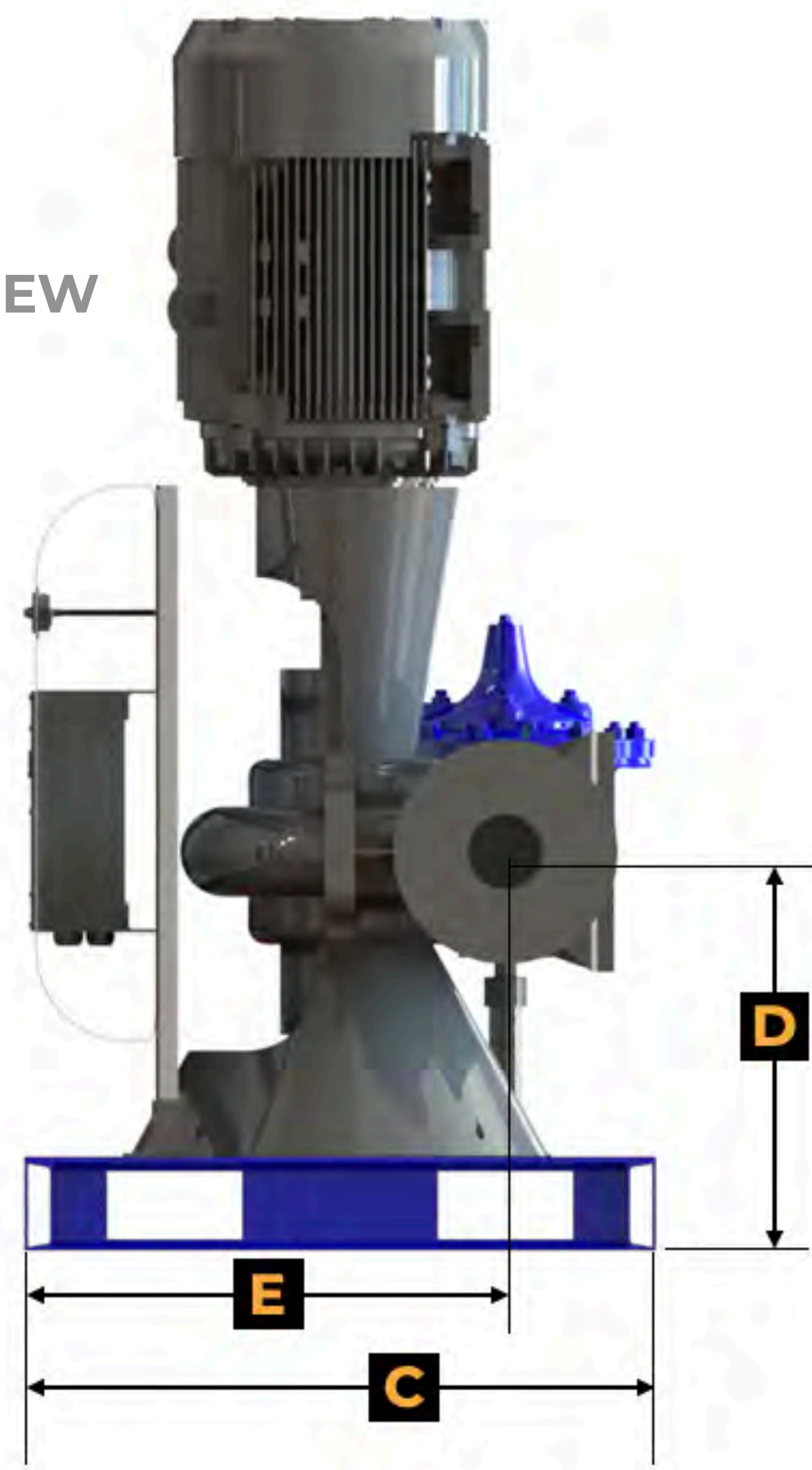


TOP VIEW



FRONT VIEW

SIDE VIEW



FLOW DIRECTION

Dimensions

	A		B		C		D		E		Weight	
System Size	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
M2	940	37	1,372	54	762	30	457	18	622	25	488	1,075
M4	1,143	45	1,372	54	876	35	460	18	470	19	726	1,600
M8	1,721	68	2,083	82	1,080	43	673	27	819	32	2,155	4,750
M12	2,235	88	2,972	117	1,334	53	762	30	914	36	4,967	10,950

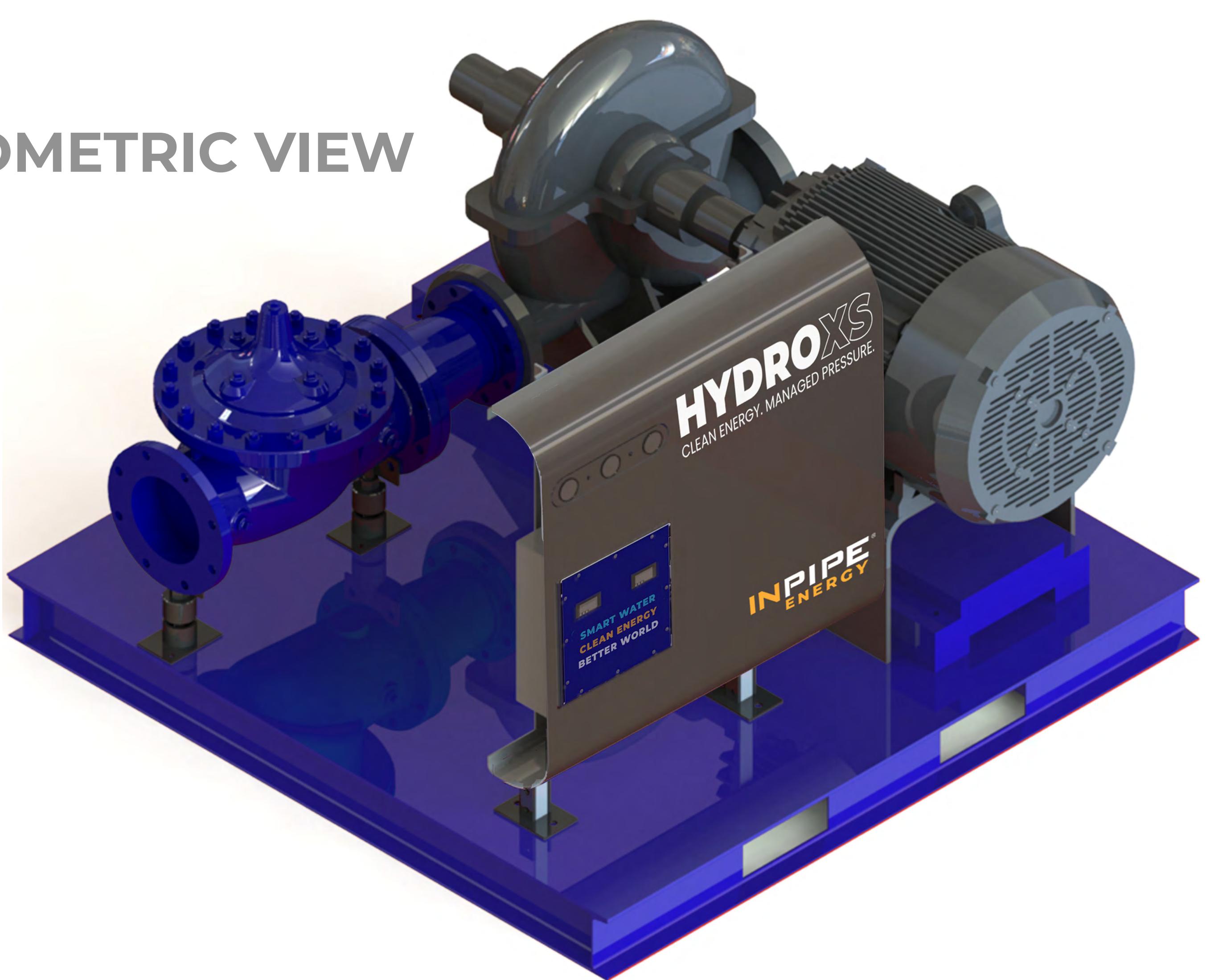
This table shows the dimensions and weights of the small vertical orientation skids

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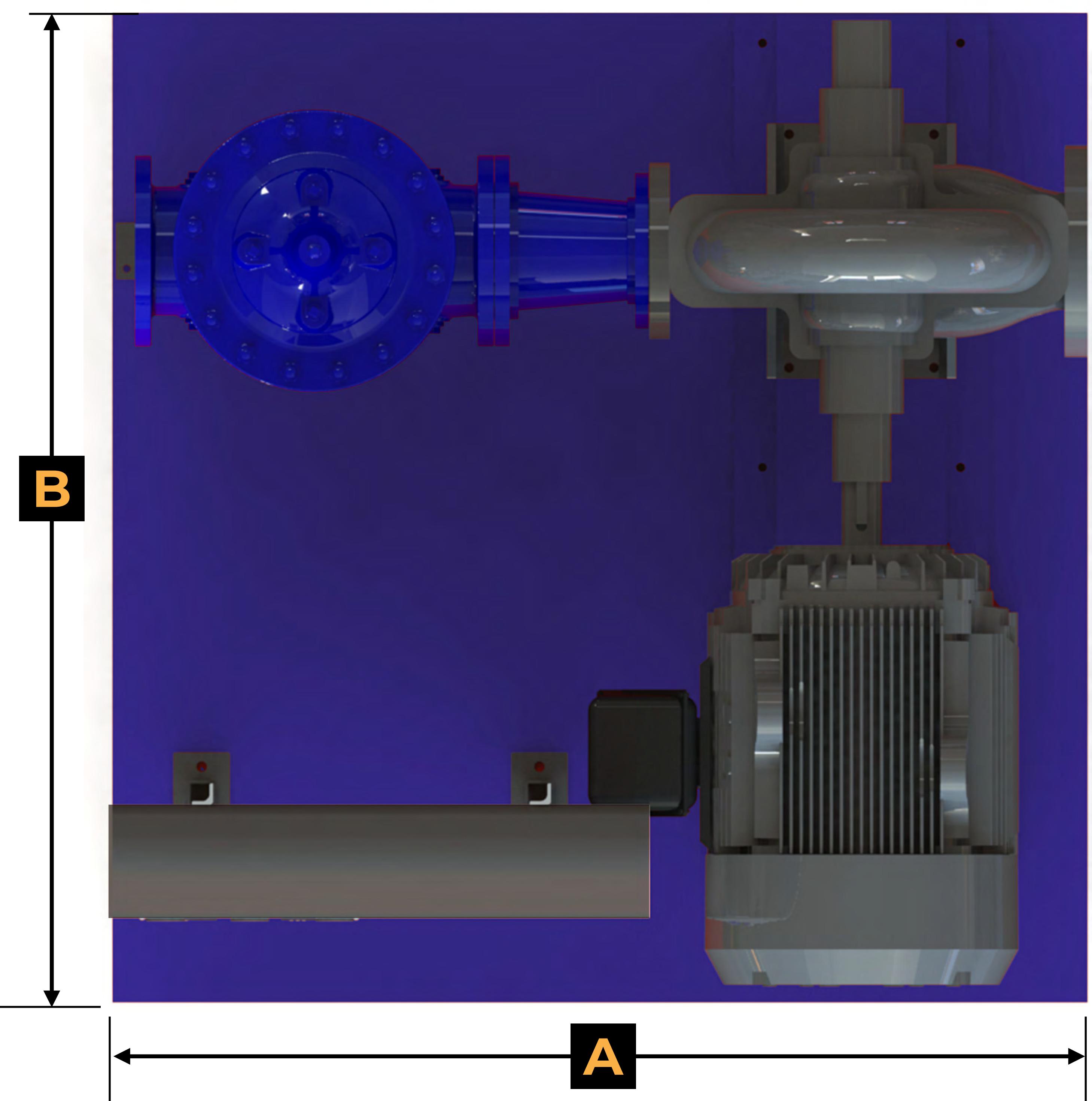
HYDROXS

**SMALL HORIZONTAL
CONFIGURATIONS
WITHOUT ENCLOSURE**

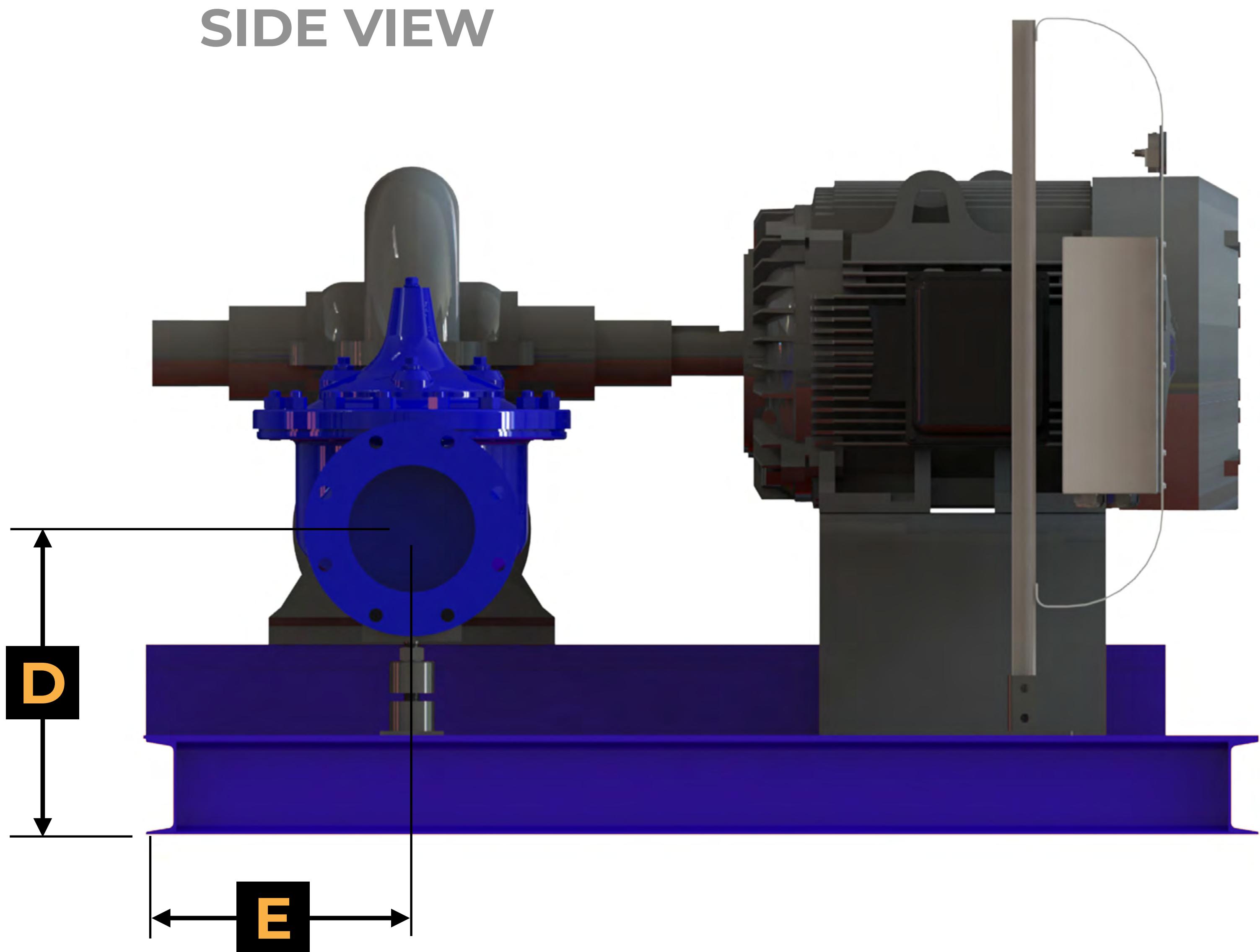
ISOMETRIC VIEW



TOP VIEW



SIDE VIEW



FRONT VIEW



FLOW DIRECTION →

Dimensions

	A		B		C		D		E		Weight	
System Size	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
M2	940	37	1,067	42	1,016	40	343	14	178	7	612	1,350
M4	1,118	44	1,219	48	1,067	42	356	14	229	9	839	1,850
M8	1,753	69	1,778	70	1,321	52	495	20	432	17	2,381	5,250
M12	2,235	88	2,337	92	1,321	52	597	24	457	18	5,194	11,450

This table shows the dimensions and weights of the small horizontal orientation skids

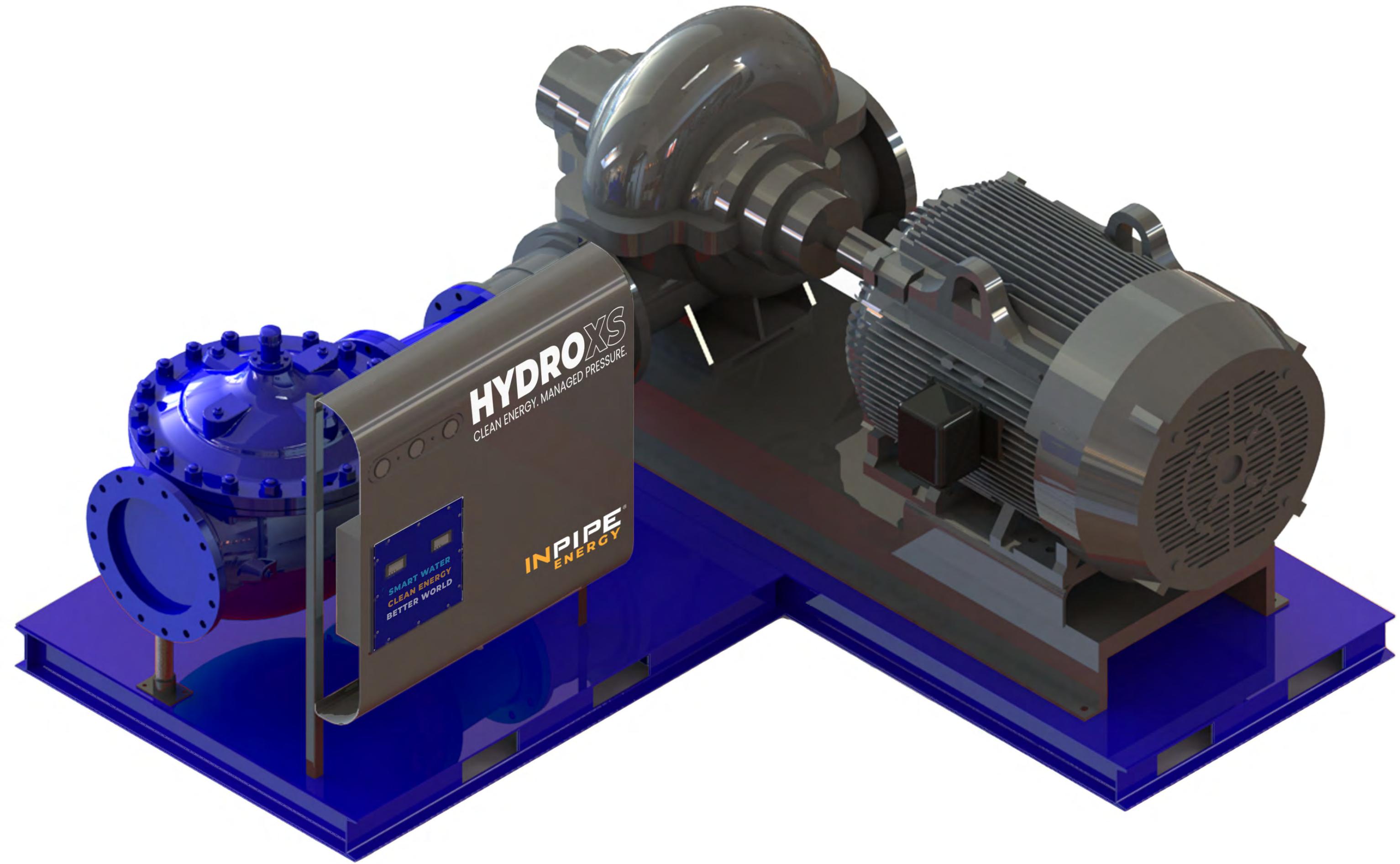
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HYDROXS

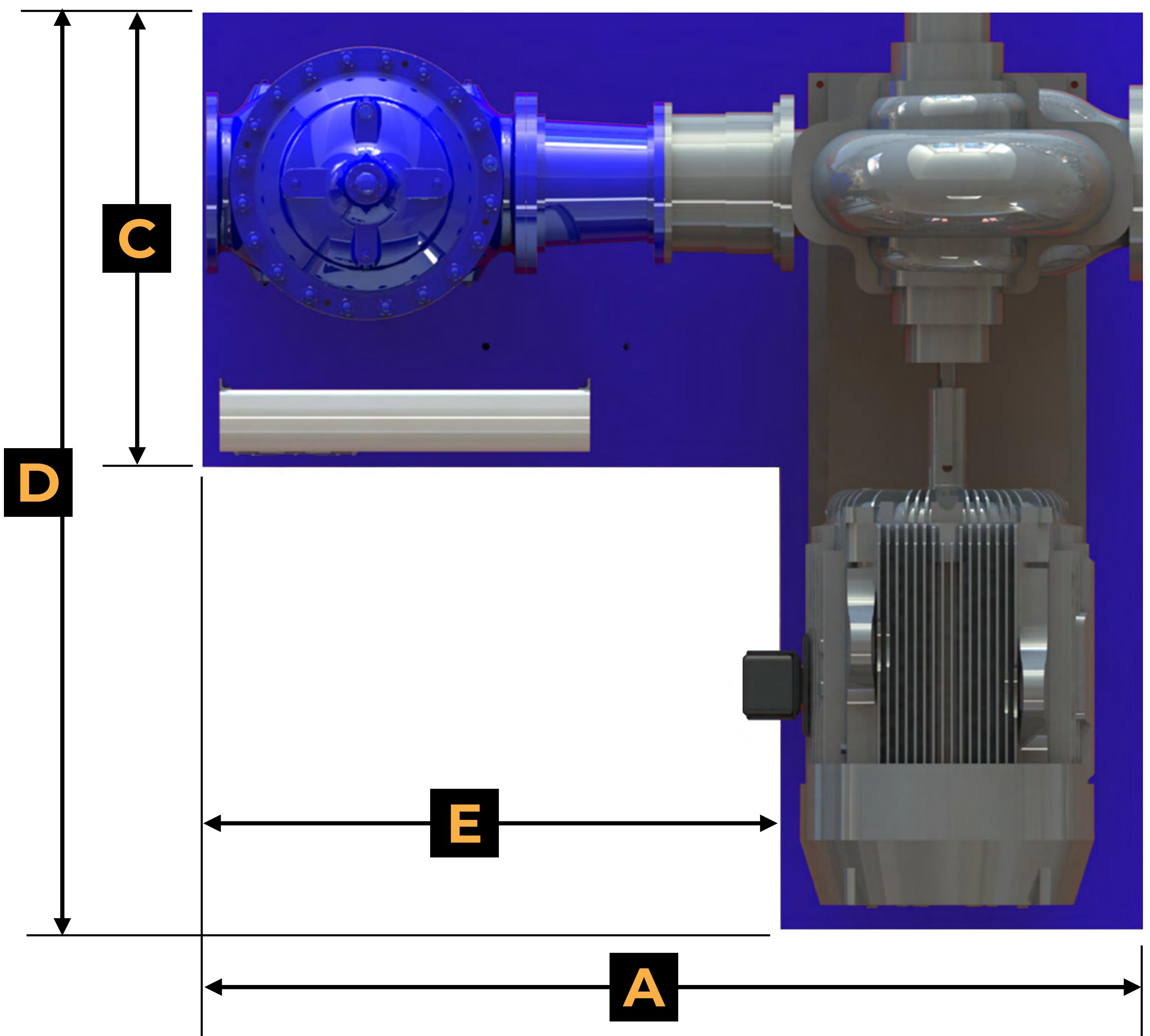
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LARGE HORIZONTAL
CONFIGURATIONS
WITHOUT ENCLOSURE

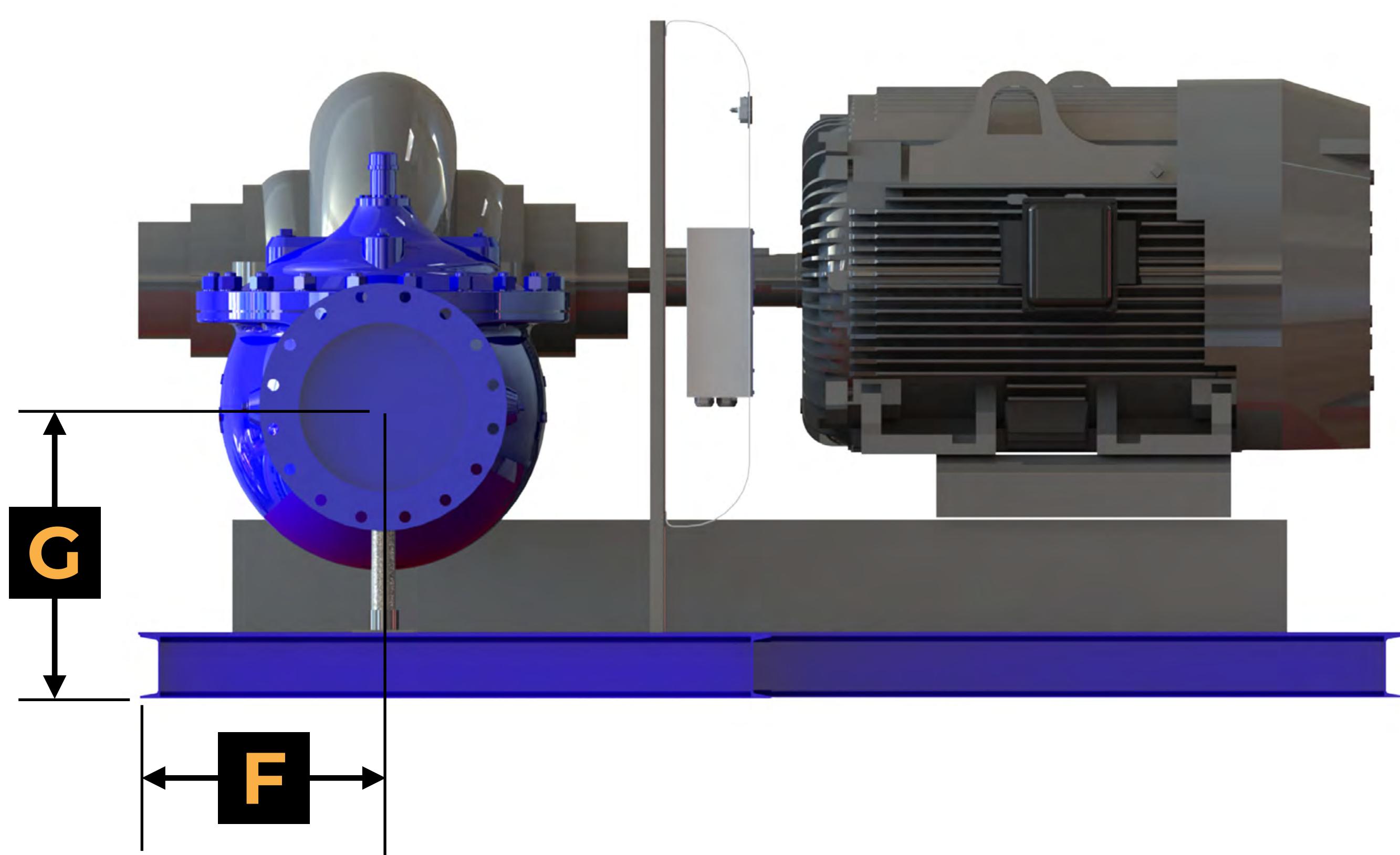
ISOMETRIC VIEW



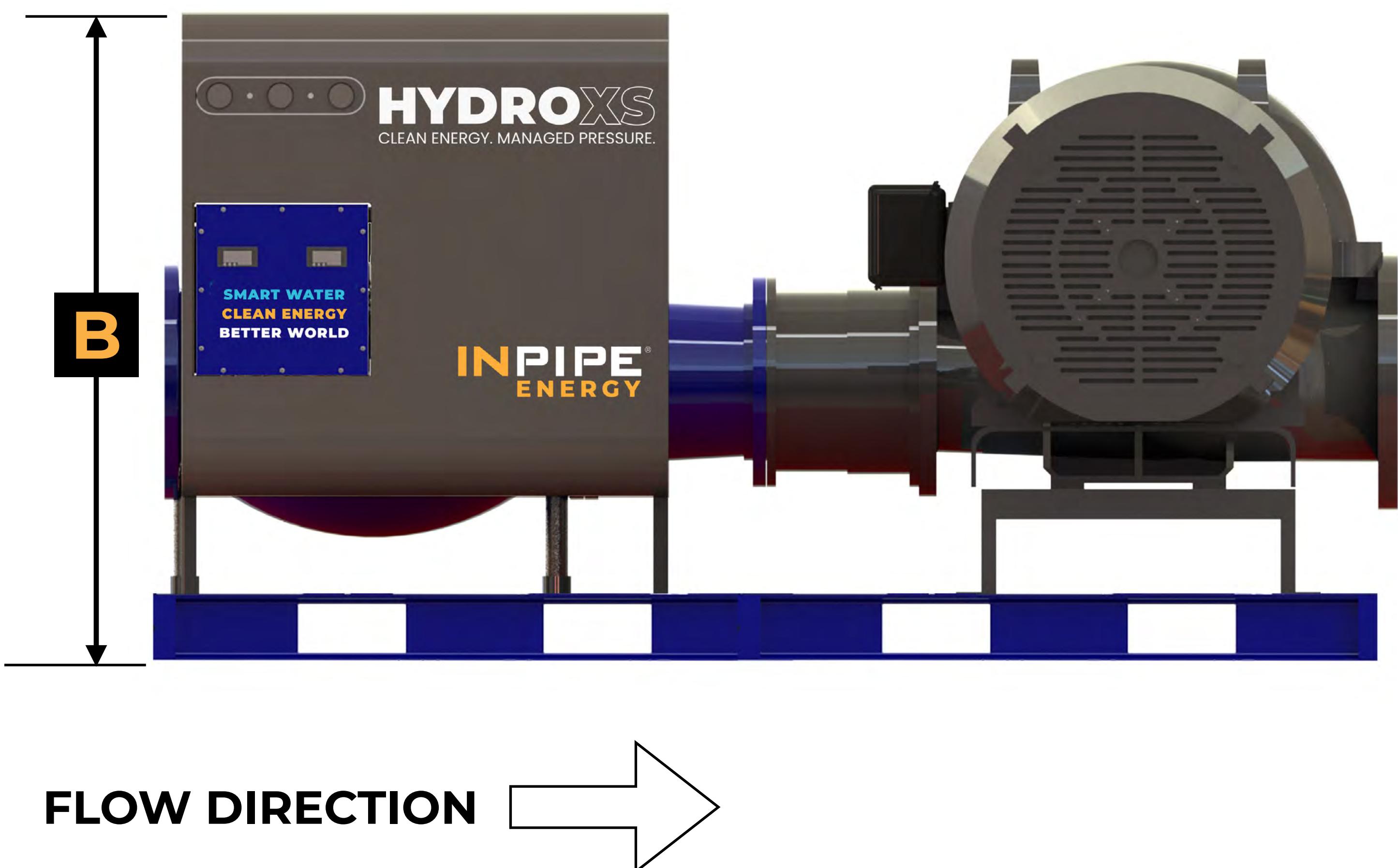
TOP VIEW



SIDE VIEW



FRONT VIEW



Dimensions

	A		B		C		D		E		F		G		Weight	
System Size	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
M16	3,124	123	1,651	65	1,524	60	3,048	120	1,905	75	591	23	699	28	8,505	18,750
M24	4,268	168	2,413	95	1,930	76	4,064	160	2,597	102	813	32	851	34	11,408	25,150
M36	5,690	224	2,845	112	2,210	87	4,674	184	3,150	124	1,118	44	1,003	40	17,428	38,422

This table shows the dimensions and weights of the large horizontal orientation skids



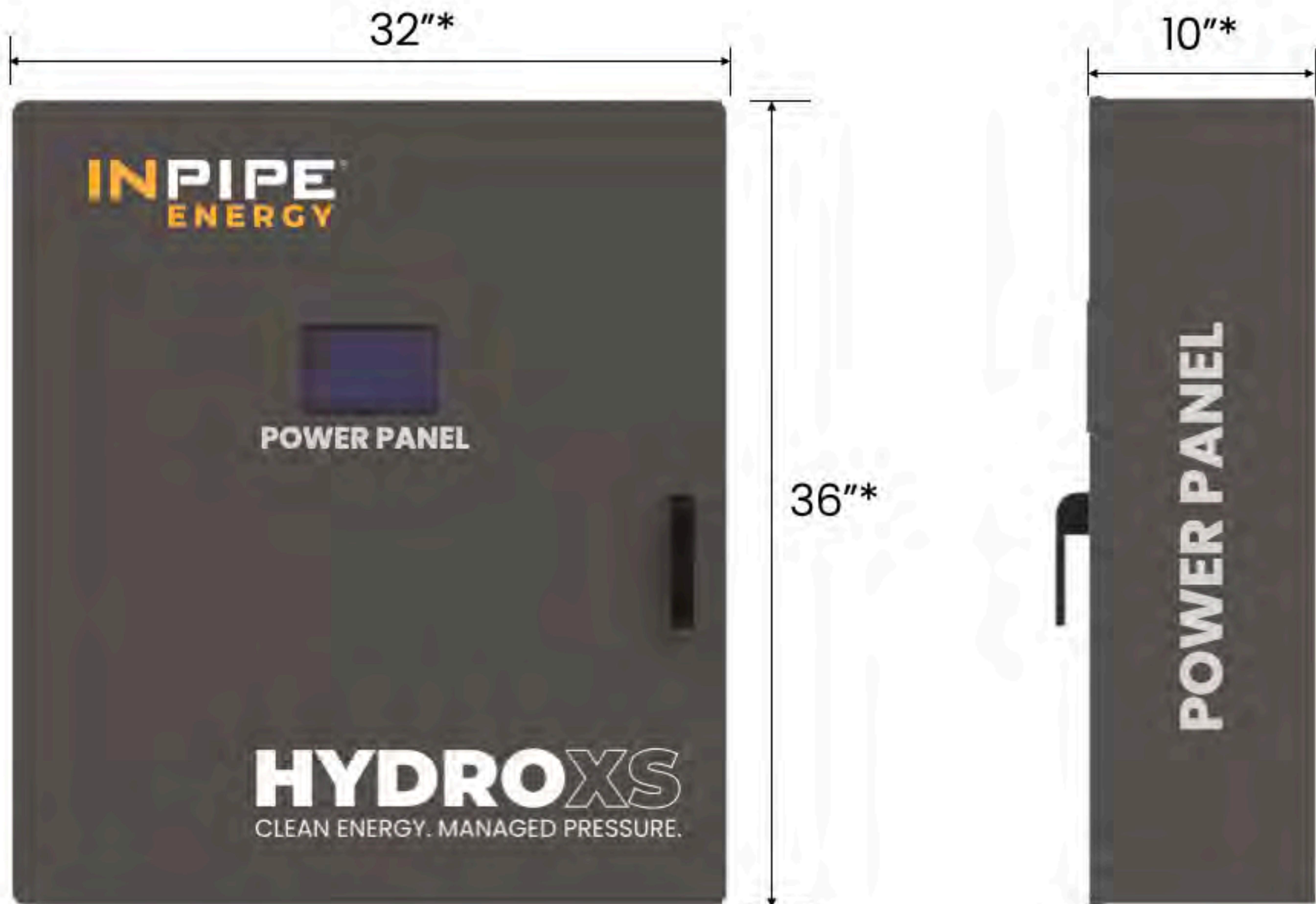
Instrumentation and Controls

Flowmeter	McCrometer
Pressure Tranducers (3)	Wika or Similar
Turbine Tachometer	Electro-Sensor
Generator Protection Relay	Schweitzer
PLC	Allen-Bradley CompactLogix
HMI	Maple Systems 10"
Controls Panel Rating	NEMA 4

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POWER PANEL

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Electrical Parameters

Power Panel Voltage Rating	480 VAC, 3ph*
Power Panel Rating	NEMA 4
Power Panel Weight	250 lbs*
Generator Control HMI	Schweitzer

* Values vary based on generator capacity

1. What models are currently available? InPipe offers seven models M2 through M36, that accommodate most of the flow and pressure that our typical applications require. They vary in power output from ~1kW up to 2,000 MW

2. Maintenance? The HydroXS follows a straightforward schedule similar to pumps and control valves. Greasing bearings, checking for cracks and leaks. Current installations have been operating over two years without incident to operations.

3. Grid Interconnection? The HydroXS is designed to deliver energy safely and reliably on to the grid. It follows the same standards that have been established by the solar energy industry and is considered safe and reliable by electric utilities. InPipe Energy is experienced at working with electric utilities and provides all the support needed for ensuring the right tariffs, incentives and programs are being used.

4. Installations? We can install the HydroXS in an existing facility, in a separate underground vault or above ground in its own enclosure.

5. Hydraulic Energy Audits? We conduct a system wide assessment of energy production by using hydraulic data you supply. This is a great first step in learning how much energy can be produced on site to build resilience and meet sustainability goals.

6. Off-grid and storage? Batteries can create a way to store and supply energy to reduce overall energy costs, create resilience, and provide energy to nearby pumps in a grid loss. Also, InPipe is developing an off grid solution that will make sure there is no disruption to water flow in the event of a grid disruption. We are seeking interested early adopters.

7. Hydraulic minimums? The amount of energy the HydroXS can generate is a function of flowrate and available pressure. Flows do not change but pressure is removed. Even if they are not consistent flows and pressure, an economic case for the HydroXS may still be possible. A minimum of 20 psig of inlet pressure is required.

8. Our offer? We will work with you every step of the way. We want your investment to make sense.

9. What voltage level(s) can the HydroXS output? We can output many different levels depending on what is required the use of different generator styles and/or inverters. Our standard voltage output of the unit is 480 VAC, 3 phase.

10. Does the HydroXS have an internal inverter option? Yes, InPipe integrates off-the-shelf inverters, more specifically, line regen AC drives.

11. Is the HydroXS NRTL listed (UL, CE, TUV Rhineland, etc.)? Our turbine is NSF, and our electrical panels are UL.

12. Are there any energy storage options available? We work with a select group of partners to provide the energy storage option as part of our integrated package.

13. Is there an internal transfer switch for alternate power source backup? Yes.

14. Are there relay output capabilities? We utilize a PLC based controls panel which has relay output options.

15. Does the HydroXS have power trending capability? We have built-in power monitoring in our power panel and data storage/trending within our controls panel.

16. What are the available communication protocols? Our standard is Ethernet IP since our standard PLC is Allen-Bradley compactlogix, we can also provide a modbus card for modbus output so it is agnostic.

17. What software is required? None is required on the client's end. We utilize Allen-Bradley as our standard. The PLC and HMI have programming software.

18. Is the HydroXS programmable to tie into a plant control system? Yes.

19. Is the HydroXS applicable in wastewater applications? Yes.

20. What are the minimum flow rates required? ~Our smallest system, M2 can go as low as 20 gallons per minute (gpm), but we recommend ~500gpm as a minimum flowrate for acceptable economics.

21. What is the lead time? ~3 months, but it does depend on the options selected.

22. Does HydroXS provide the ability to adjust pressure reduction during its operation ? Yes, through the combination of our integrated pressure reducing valve and variable speed turbine we can adjust downstream pressure and maximize power output.

23. What happens if there is a catastrophic failure of the HydroXS? In the event the grid goes down or the turbine fails, then the upstream control valve will close and all the water will flow through your existing pipeline.

For a FREE Hydraulic & Potential Energy Assessment go to InPipeEnergy.com

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CONTACT INFORMATION
SALES@InPipeEnergy.com
310-906-0783

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