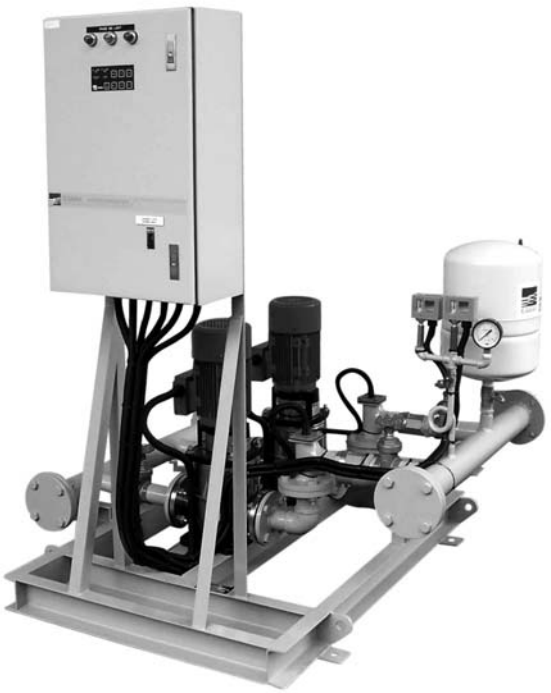
EBARA FLOW SWITCH CONTROLLED BOOSTER SYSTEM



Ebara Hydro Booster pressure set type UD is a flow switch control system which prevents frequent start/ stop of pumps, thus ensure constant water supply.

Application

Domestic : High-rise buildings, Condominiums, Apartments etc.
Commercial : Office buildings, Hotels, Shopping centres etc.
Industrial : High-rise factories, Manufacturing & Processing industries applications etc.
Social Service : Schools, Hospitals etc.

Construction Features

Fully assembled and certified Hydro Booster unit consisting of one or two (2) pump arranged in parallel, mounted on a common baseframe, pipework complete with all hydraulically required parts, EBARA Controller unit, pressure switches and flow switches together with complete internal electrical wiring.

Baseframe & Common Pipework

Galvanized pipework to enable easy connection to all commonly used pipe fittings. The pipework is sized suitable for maximum hydraulic unit capacity. Check valves and suitable gate valves are fitted for optimal system operation.

Pumps

Single or two (2) EBARA pumps arranged for parallel operation. All parts contact with liquid are of stainless steel.

Diaphragm Pressure Tank

A pre-charged diaphragm tank is fitted to the discharge pipe with a compatible Butyl-rubber diaphragm. Generally this tank serves basic functions of supplying water at a very low flow and minimising effect of water hammering.

Pressure Switches

The pressure switch controls start/stop of pump operation. Stop-value of pressure switch should be 0.6kgf/cm2 higher than pump supply pressure. Start value of pressure should be set so that the water supply appliance at the highest point of building or the most remote place has sufficient water supply pressure.

Flow Switch

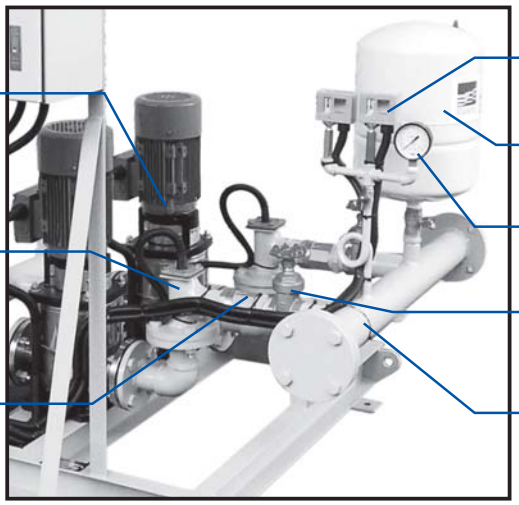
The primary function of flow switch is to detect low flow condition, and cut off pump operation during very low flow condition. This reduces the frequency of on/off pump to prolong operating life of pumping system.

EBARA FLOW SWITCH CONTROLLED BOOSTER SYSTEM

Pump
Stainless steel casing and impeller provide rusty-free water supply

Flow switch
Detects very low flow to cut off No. 1 pump thus reducing frequency of on / off pump at low flow

Check valve
Quick closing action reduces water hammer



Pressure switches
Adjustment type-signal cut-in and cut-out pumps

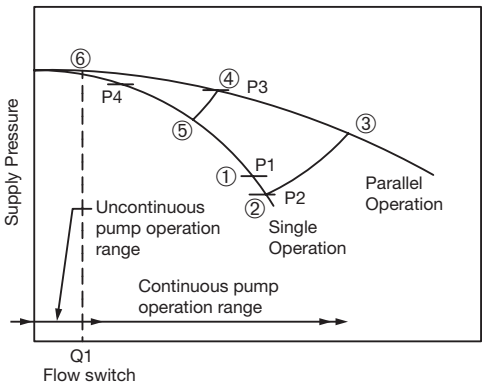
Pre-charge diaphragm tank

Pressure gauge
Indicator of water pressure

Isolating Valve

Discharge pipe
Galvanize pipework provides to enable easy connection

UD - CONTROL SYSTEM



Step 1) Both pumps are stopped when water tank is fully charged. In this condition water is supplied from the pressure tank, and water pressure in tank gradually decreases.

Step 2) No. 1 pump starts at pressure P1 (Point ①) and water is supplied from pump (and pressure tank).

Step 3) When more water is required and water pressure decreases to P2 (Point ②), No. 2 pump also starts, operation point shifts to Point ③ and system shifts to parallel operation.

Step 4) When water consumption decreases, water pressure in tank increases and when pressure reaches P3 (Point ④), No. 2 pump is stopped and operation point shifts to Point ⑤.

Step 5) When water consumption further decreases, water pressure in tank increases and pressure switch is turned off, and the flow switch used to detect small flow, is turned off. When both pressure and flow switches are off, No. 1 pump stops (Point ⑥). Flow switch setting point is at small capacity point, therefore pump continuous operation range is much wider. Accordingly pump start frequency is greatly decreased.

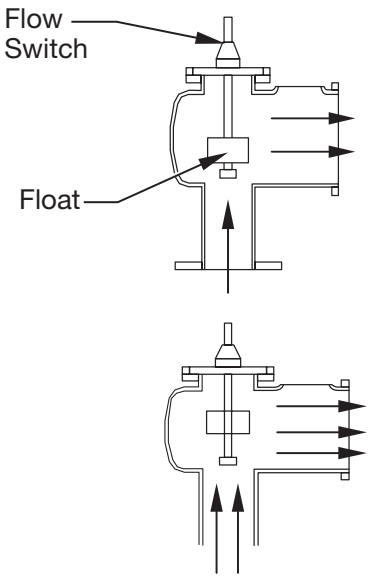
EBARA FLOW SWITCH CONTROLLED BOOSTER SYSTEM

Flow Switch

The primary function of flow switch is to detect a very low flow in order to cut off No.1 pump. This reduces the frequency of on/off pump at low flow. The life of pump is thus prolonged. The fundamental working principle is shown graphically as below.

At a very low flow, the float of the flow switch positions itself at/almost to its lowest resting position. That is, water pressure force from pump discharge is equivalent/lesser than the weight of the float. The location of the float sends signal out to trigger No.1 pump to stop.

At higher flow, the float is lifted up by the water pressure force from pump discharge. Its location is determined by the balancing act between its own weight and water pressure force. Signal generates no impact in operation on pump.



UD - CONTROLLED UNIT

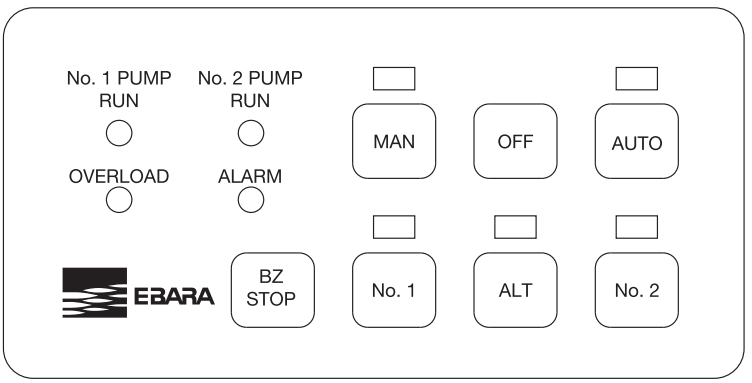
The heart of the system is the EBARA controller unit, which is user-friendly and permit 'One-touch' operation. It controls the sequence of pump operation with signals input from the pressure switch and/or flow switch in Auto & Alternate mode.

EBARA controller unit generally provides the below 'one-touch' functioning features:
- 1x Selector switch (P1/P2/ALT)
- 1x Selector switch (Manual/Auto/Off)
- 1x Power incoming indicating light
- 2x Pump RUN indicating light
- 1x Pump overload indicating light
- 1x Alarm (fault) indicating light
- 1x Buzzer stop

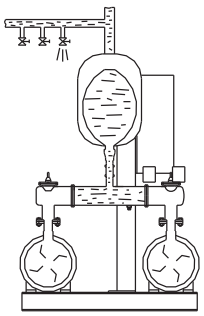
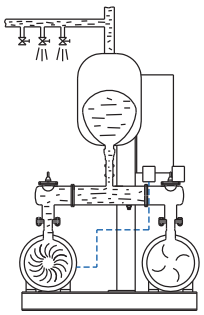
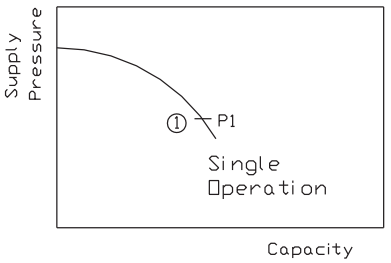
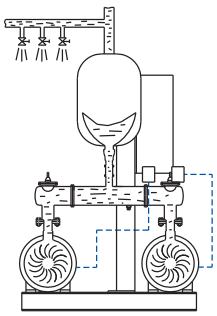
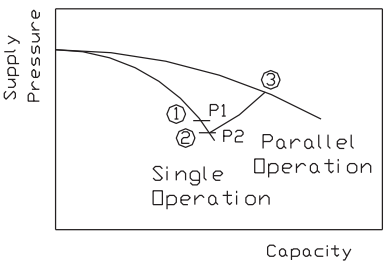
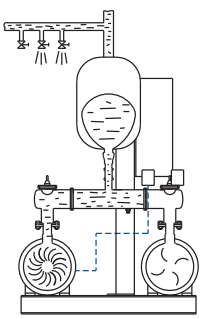
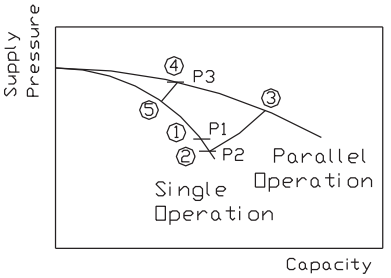
This user-friendly controller unit operates compatible with other electrical components to ensure smooth functioning of booster system.

Fig. below shows the display of panel board. Two modes of operation are possible, namely manual and auto & alternate.

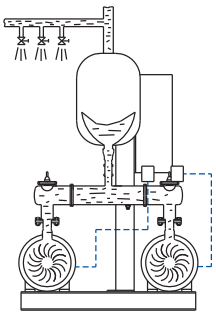
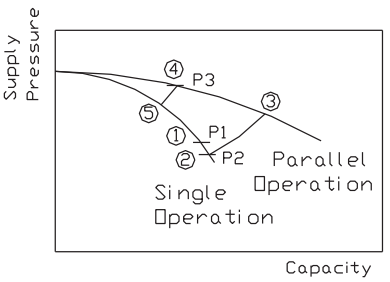
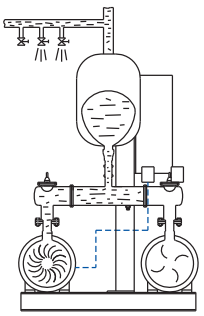
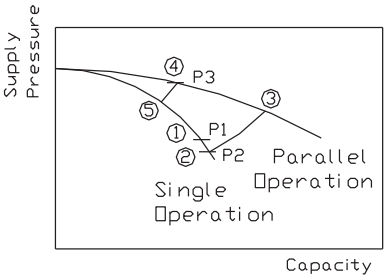
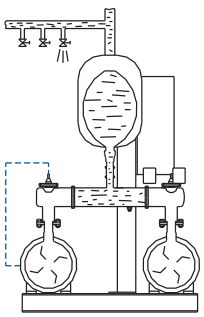
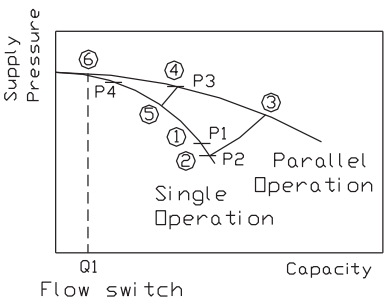
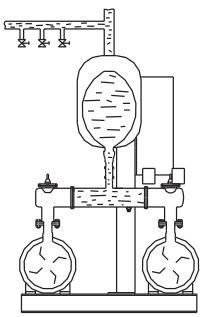
Various configurations of standard control panel are available. It varies from indoor to outdoor, DOL to star-delta starter and auto transformer type panel.



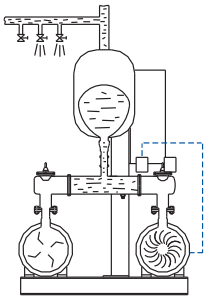
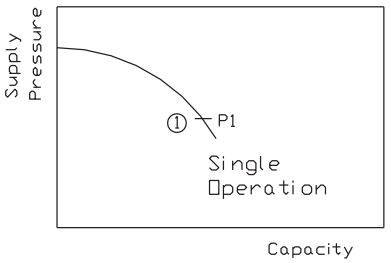
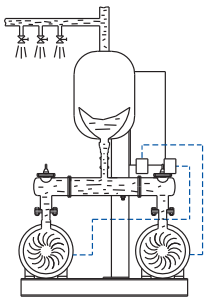
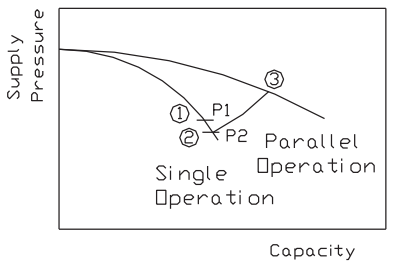
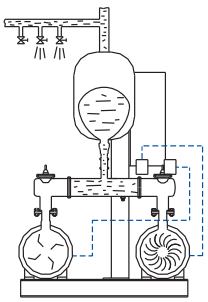
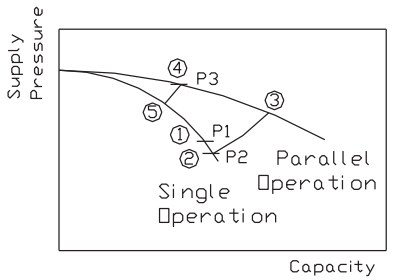
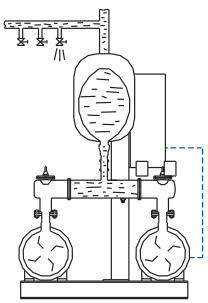
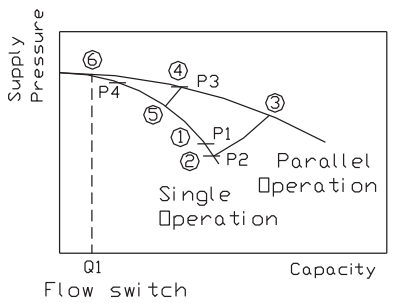
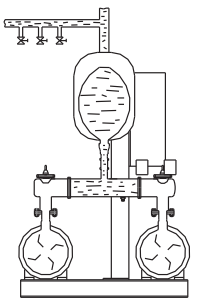
EBARA FLOW SWITCH CONTROLLED BOOSTER SYSTEM - OPERATION METHOD

Schematic Diagram	Operation	System Performance Curve
	Both pumps not operating at very low flow & small demand. Water supplies directly from hydro-pneumatic pressure vessel.	N/A
	At higher flow & higher demand water pressure in hydro-pneumatic pressure vessel decreases to P1 (point ①). No. 1 pressure switch initiates start of No. 1 pump.	
	At higher flow & water pressure decreases to P2 (point ②). No. 2 pressure switch triggers No. 2 pump to start & system shifts to parallel operation (operation point is at point ③).	
	As water consumption decreases & water pressure increases to P3 (point ④). No. 2 pressure switch activates No. 2 pump to stop & operation shifts to point ⑤.	

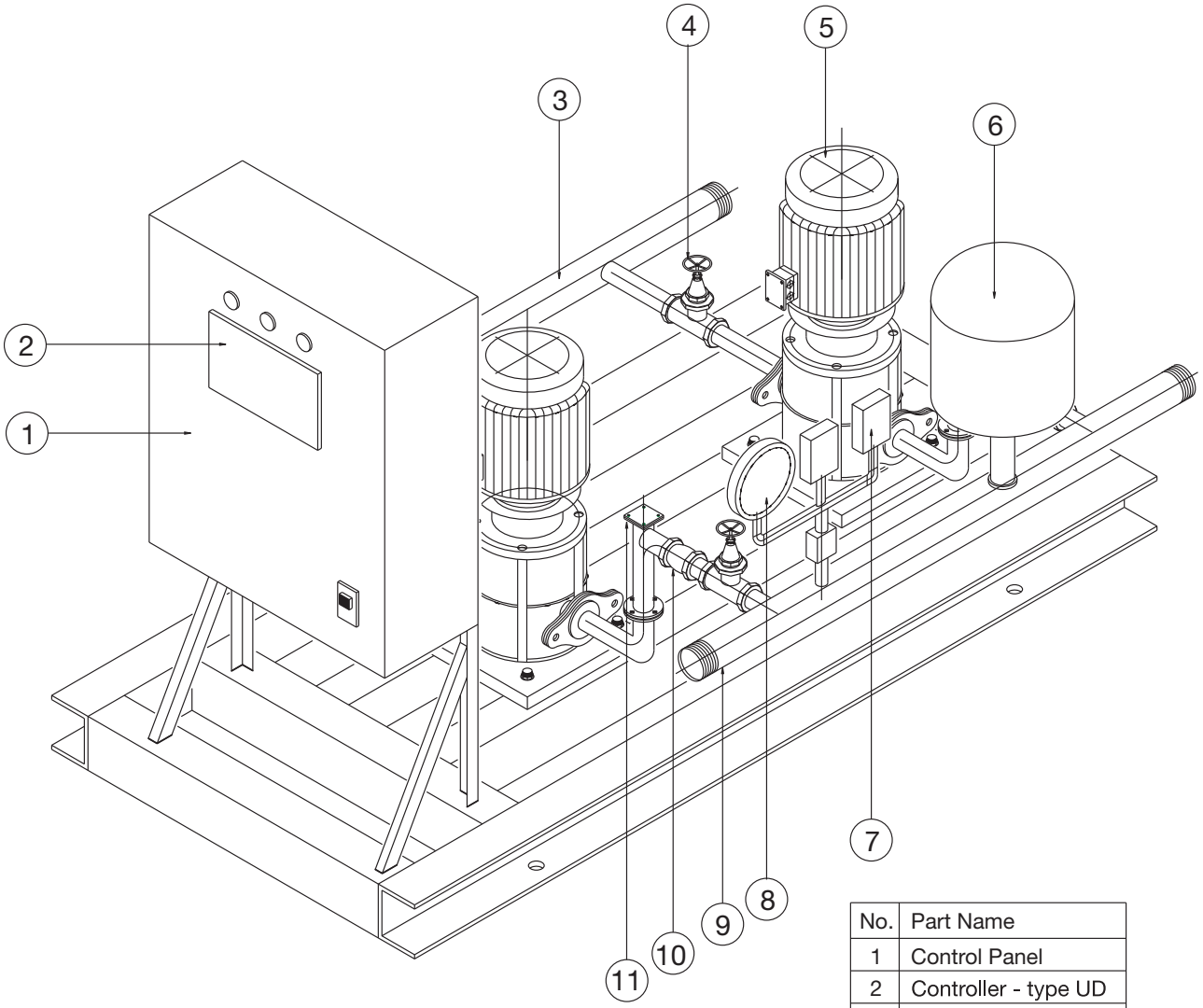
EBARA FLOW SWITCH CONTROLLED BOOSTER SYSTEM - OPERATION METHOD

Schematic Diagram	Operation	System Performance Curve
	At higher flow & water pressure decreases to P2 (point ②). No. 2 pressure switch triggers No. 2 pump to start & system shifts to parallel operation (operation point is at point ③)	
	As water consumption decreases & water pressure increases to P3 (point ④). No. 2 pressure switch activates No. 2 pump to stop & operation shifts to point ⑤.	
	As water consumption further decreases & water pressure increases to P4. No. 1 pressure switch cut off. Flow switch triggers No. 1 pump to stop at very low flow of Q1 (point ⑥).	
	Both pumps not operating at no demand.	N/A

EBARA FLOW SWITCH CONTROLLED BOOSTER SYSTEM - OPERATION METHOD

Schematic Diagram	Operation	System Performance Curve
	As demand increases again & water pressure in hydropneumatic pressure vessel decreases to P1 (point ①) No. 1 pressure switch initiates start of No.2 pump.	
	At higher flow & water pressure decreases to P2 (point ②). No. 2 pressure switch triggers No. 1 pump to start & system shifts to parallel operation (operation point is at point ③).	
	As water consumption decreases & water pressure increases to P3 (point ④). No. 2 pressure switch activates No. 1 pump to stop & operation shifts to point ⑤.	
	As water consumption further decreases & water pressure increases to P4. No. 1 pressure switch cut off. Flow switch triggers No. 2 pump to stop at very low flow of Q1 (point ⑥).	
	Both pumps not operating at no demand.	N/A

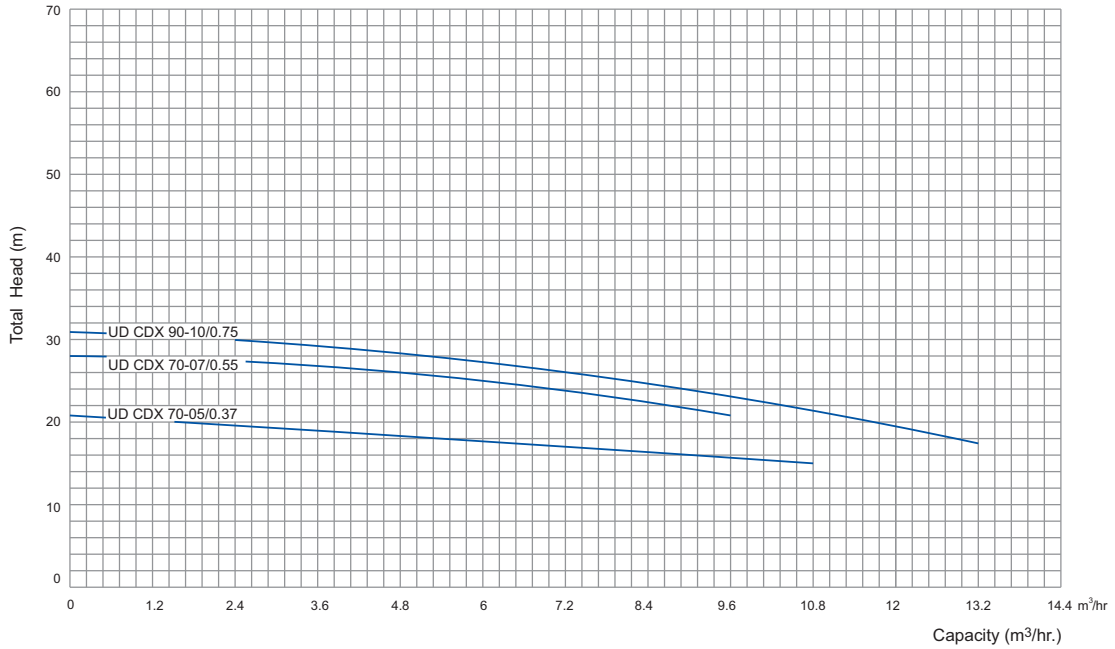
ISOMETRIC DRAWING



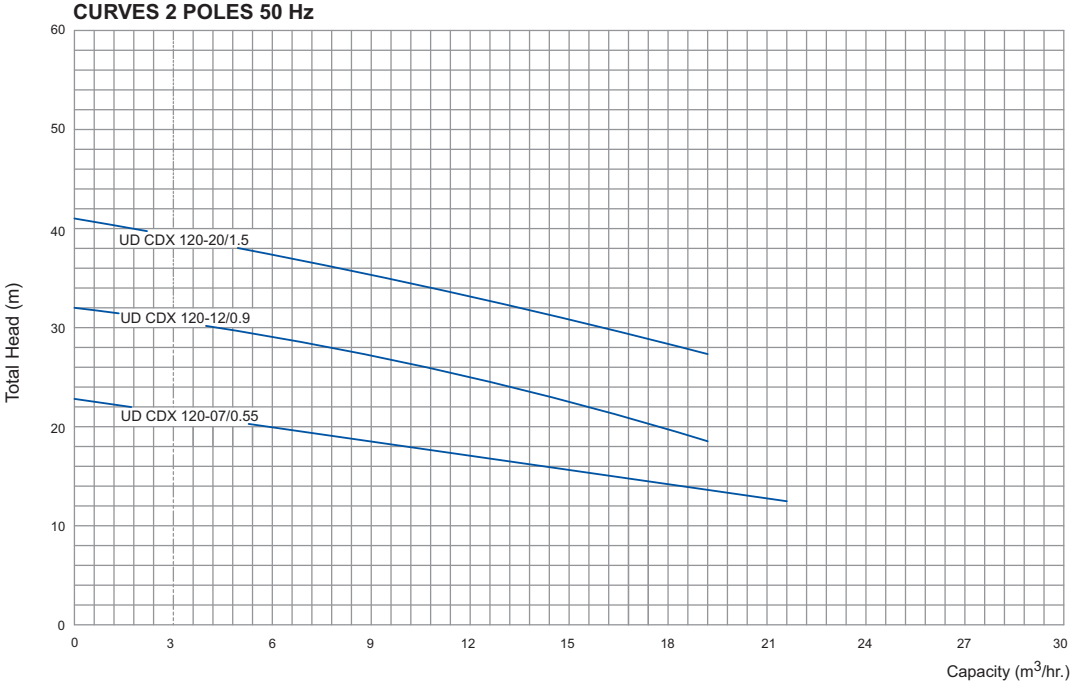
No.	Part Name
1	Control Panel
2	Controller - type UD
3	Suction Manifold
4	Gate Valve
5	Pump
6	Diaphragm Tank
7	Pressure Switch
8	Pressure Gauge
9	Discharge Manifold
10	Check Valve
11	Flow Switch

SELECTION GUIDE

UD CDX 70 / 90
CURVES 2 POLES 50 Hz

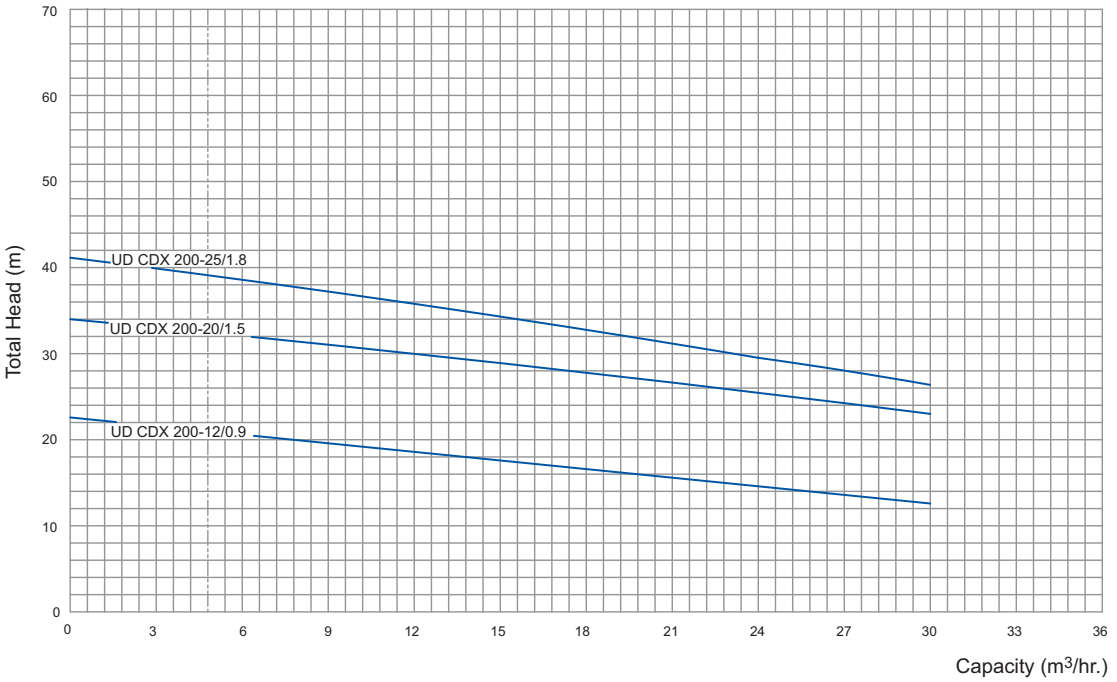


UD CDX 120
CURVES 2 POLES 50 Hz

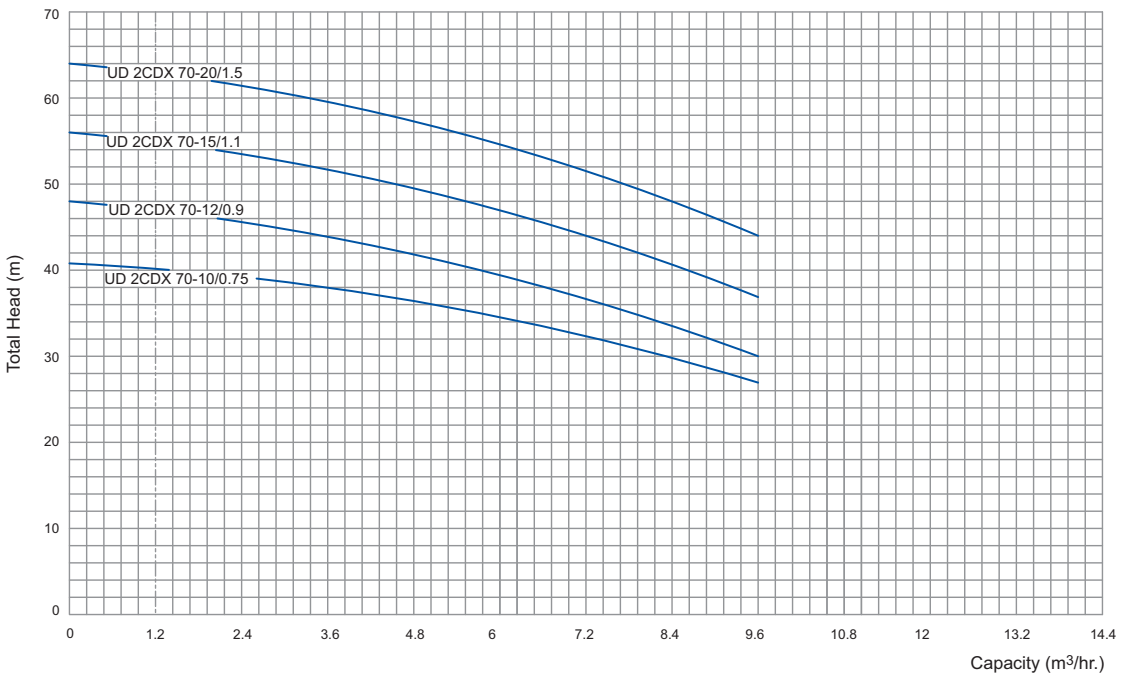


SELECTION GUIDE

UD CDX 200
CURVES 2 POLES 50 Hz

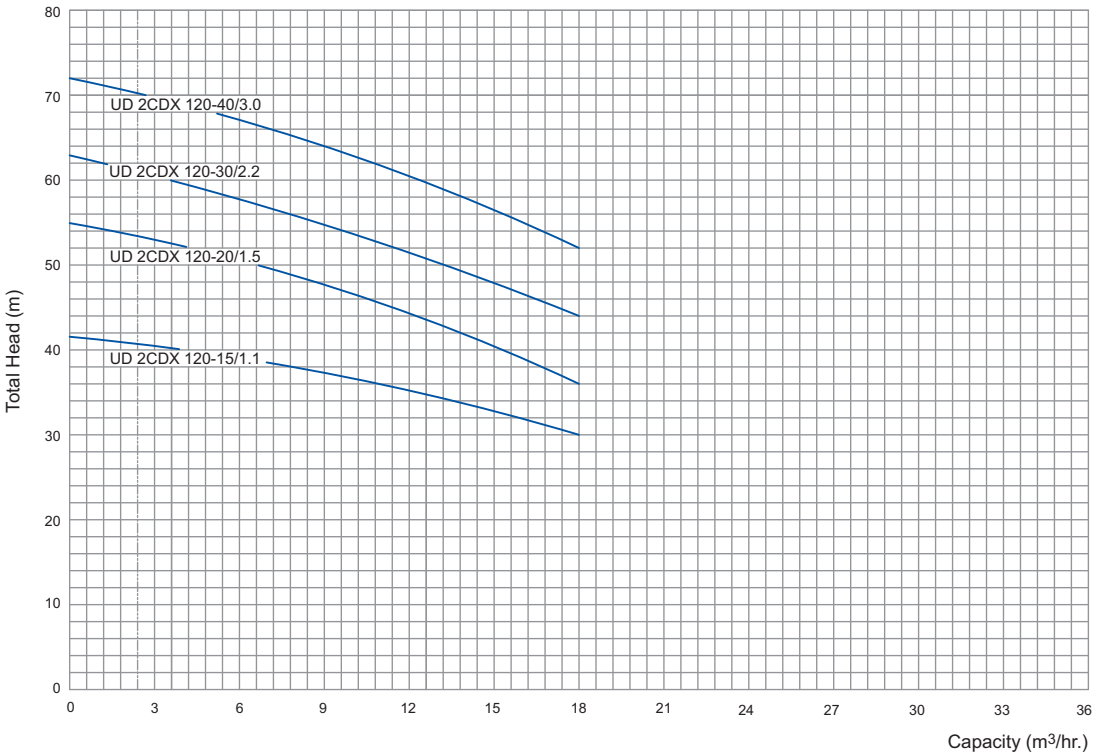


UD 2CDX 70
CURVES 2 POLES 50 Hz

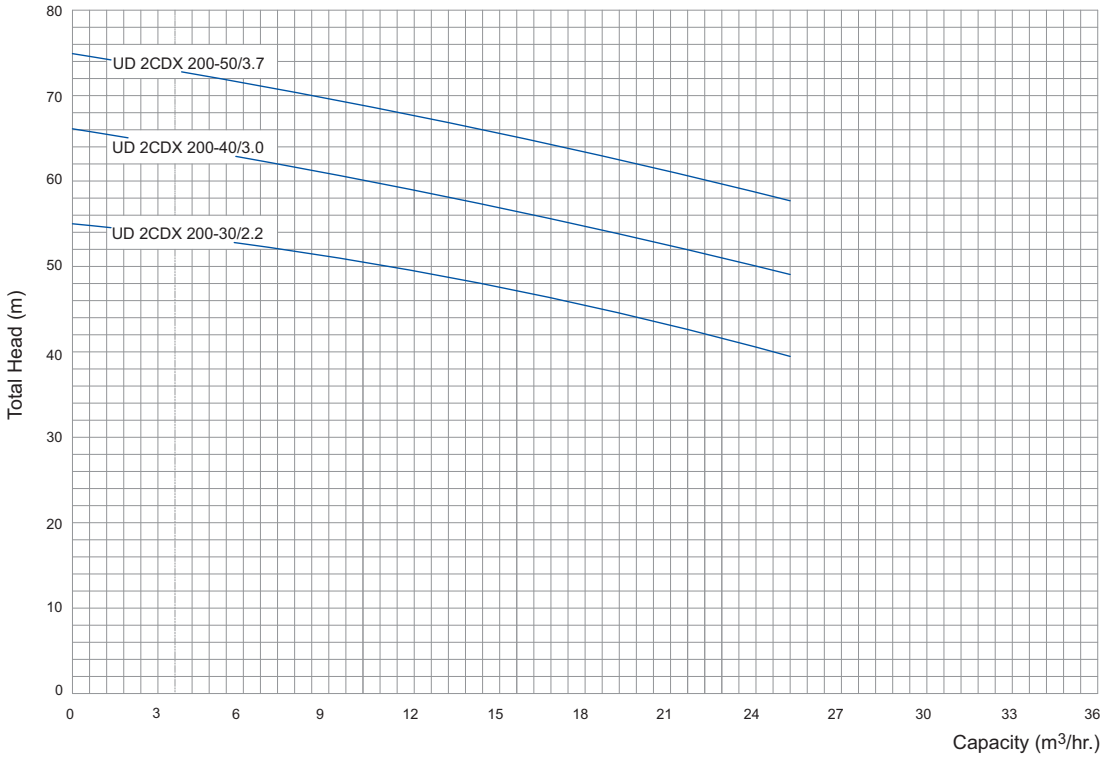


SELECTION GUIDE

UD 2CDX 120
CURVES 2 POLES 50 Hz

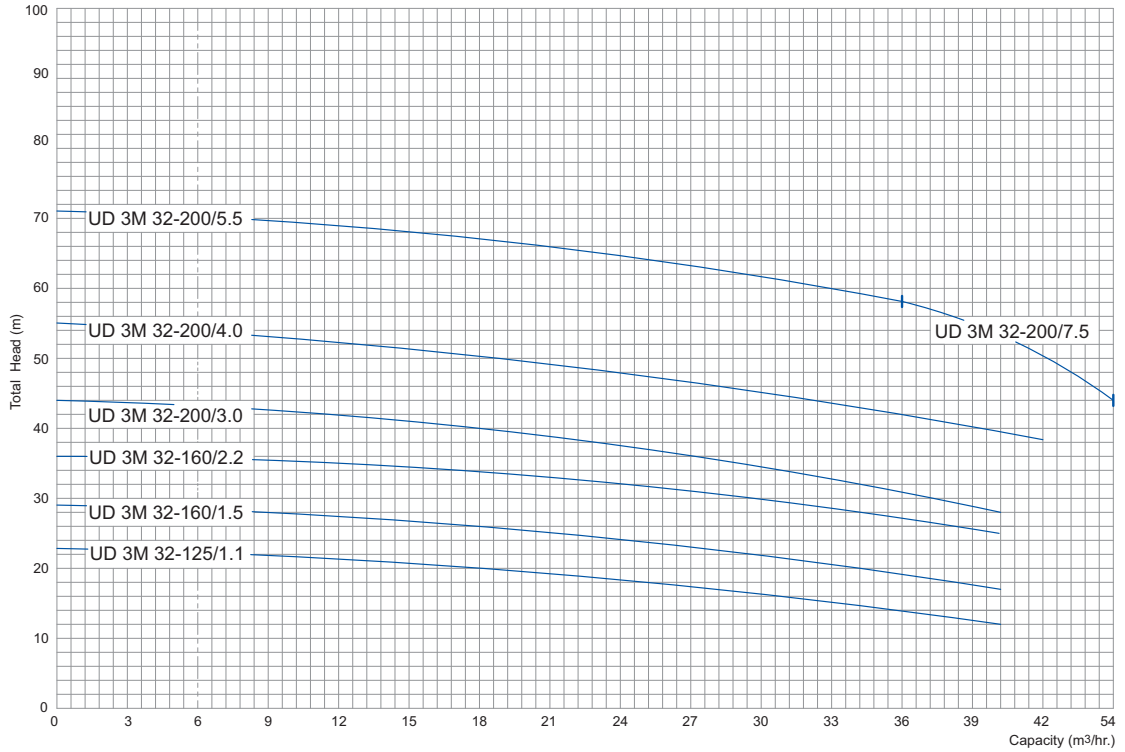


UD 2CDX 200
CURVES 2 POLES 50 Hz

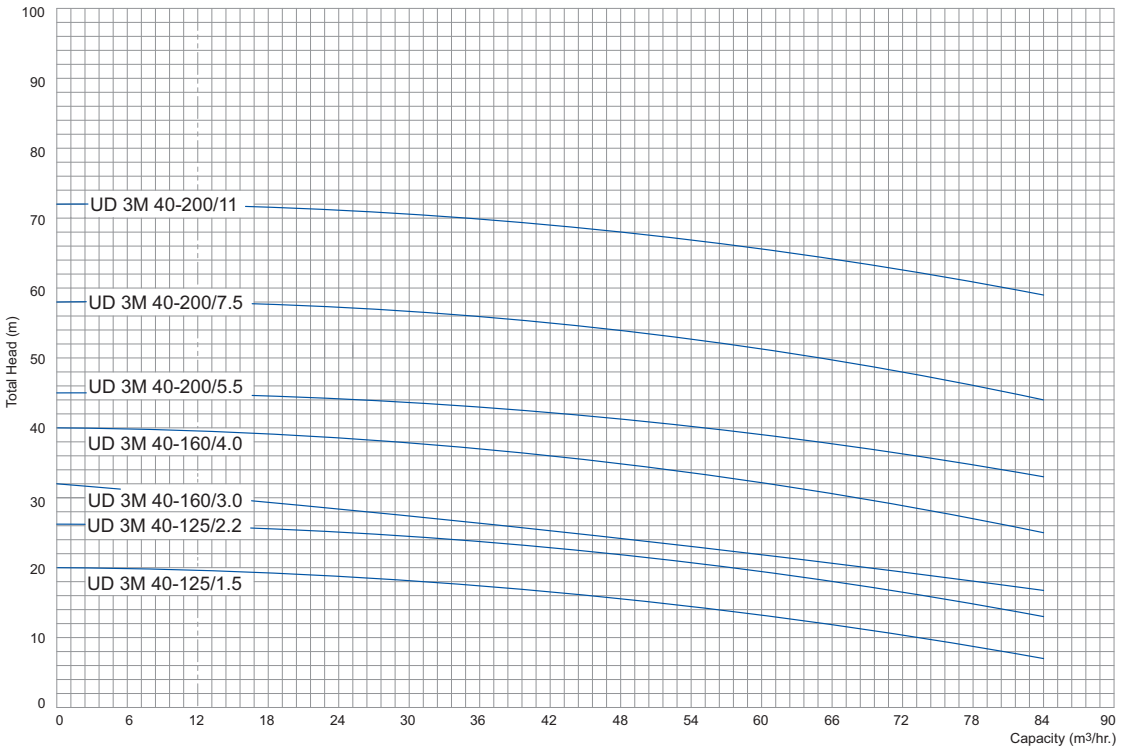


SELECTION GUIDE

UD 3M 32
CURVES 2 POLES 50 Hz

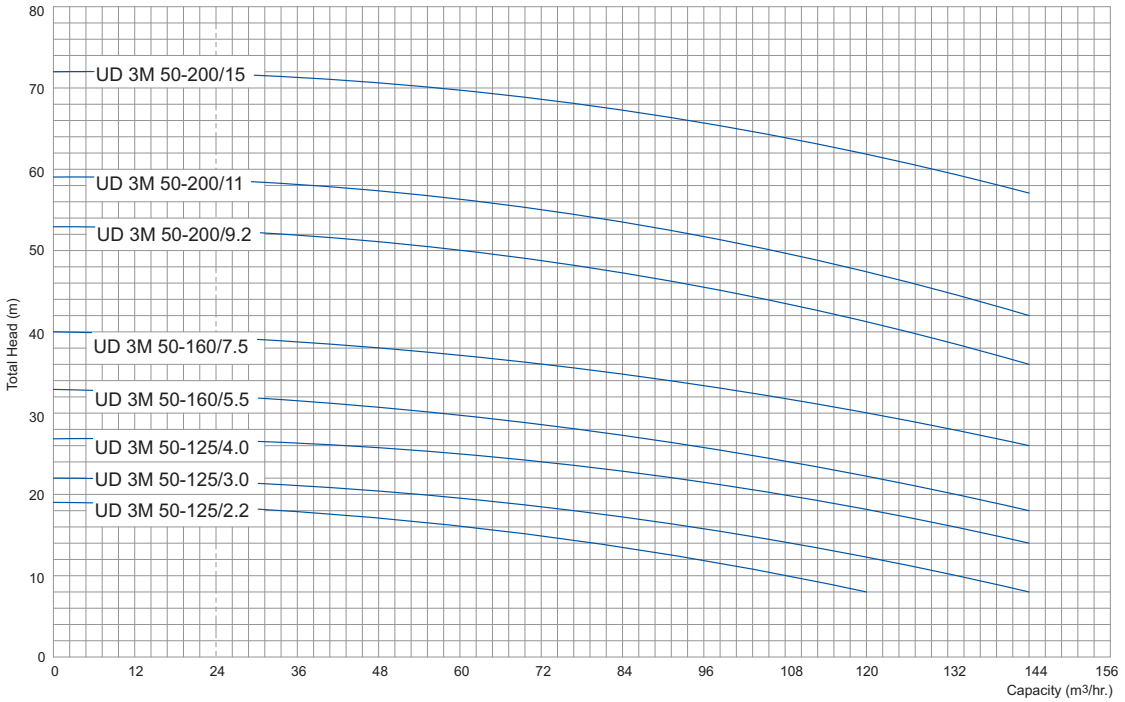


UD 3M 40
CURVES 2 POLES 50 Hz

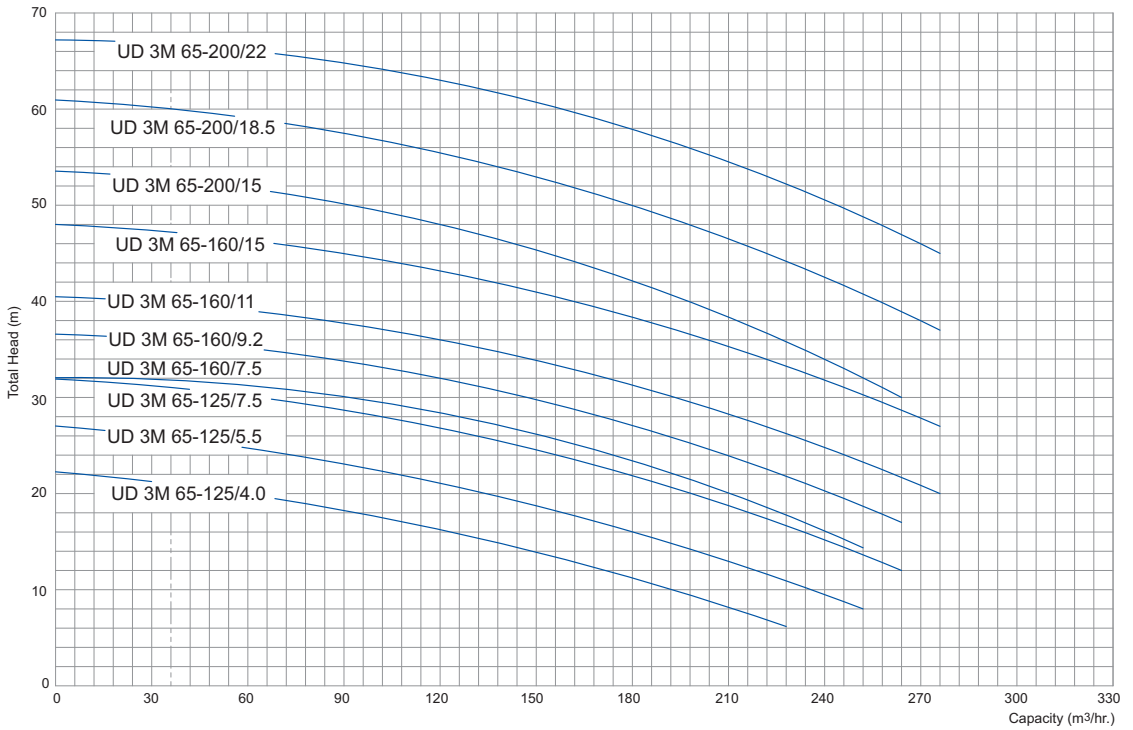


SELECTION GUIDE

UD 3M 50
CURVES 2 POLES 50 Hz

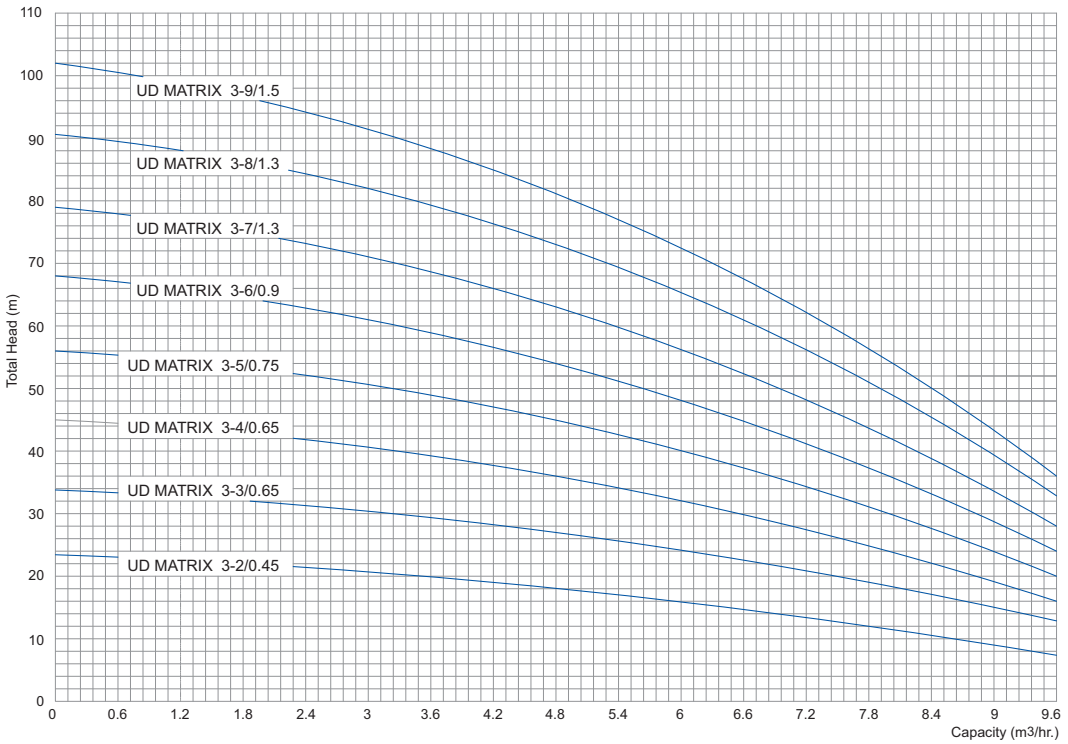


UD 3M 65
CURVES 2 POLES 50 Hz

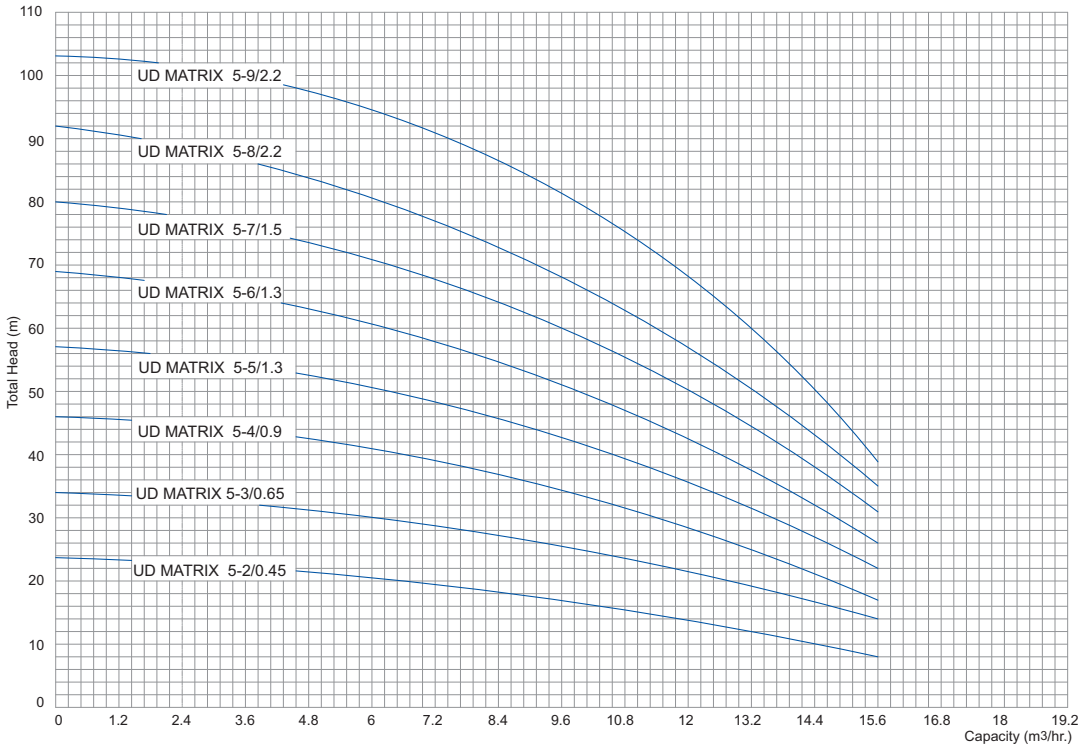


SELECTION GUIDE

UD MATRIX 3
CURVES 2 POLES 50 Hz

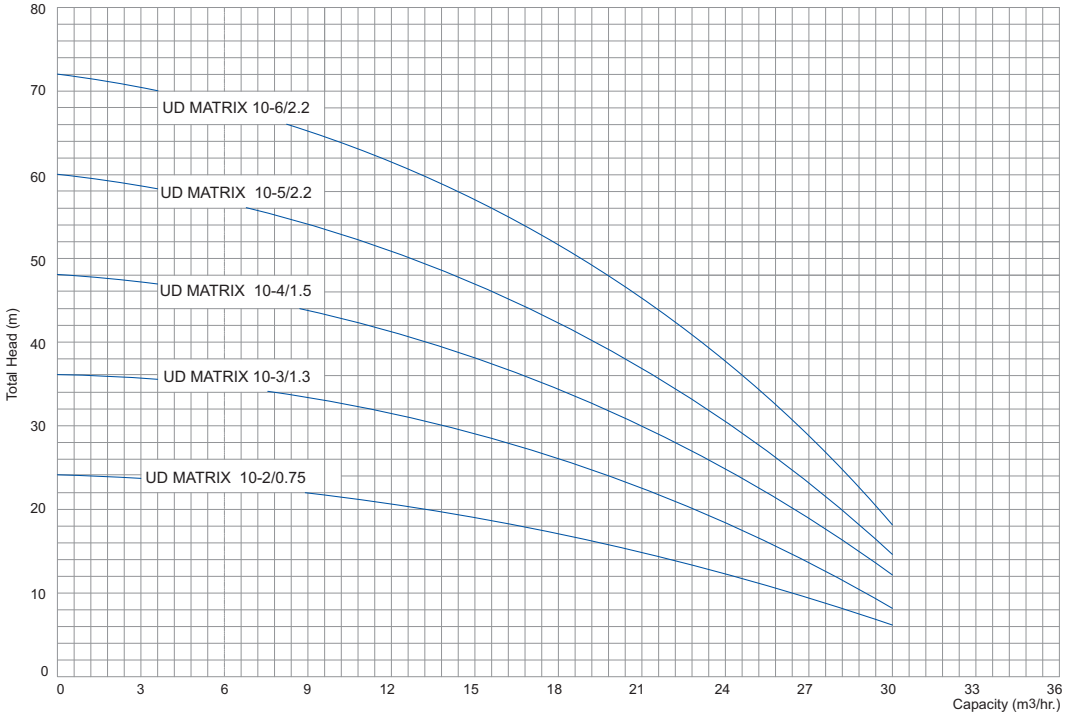


UD MATRIX 5
CURVES 2 POLES 50 Hz

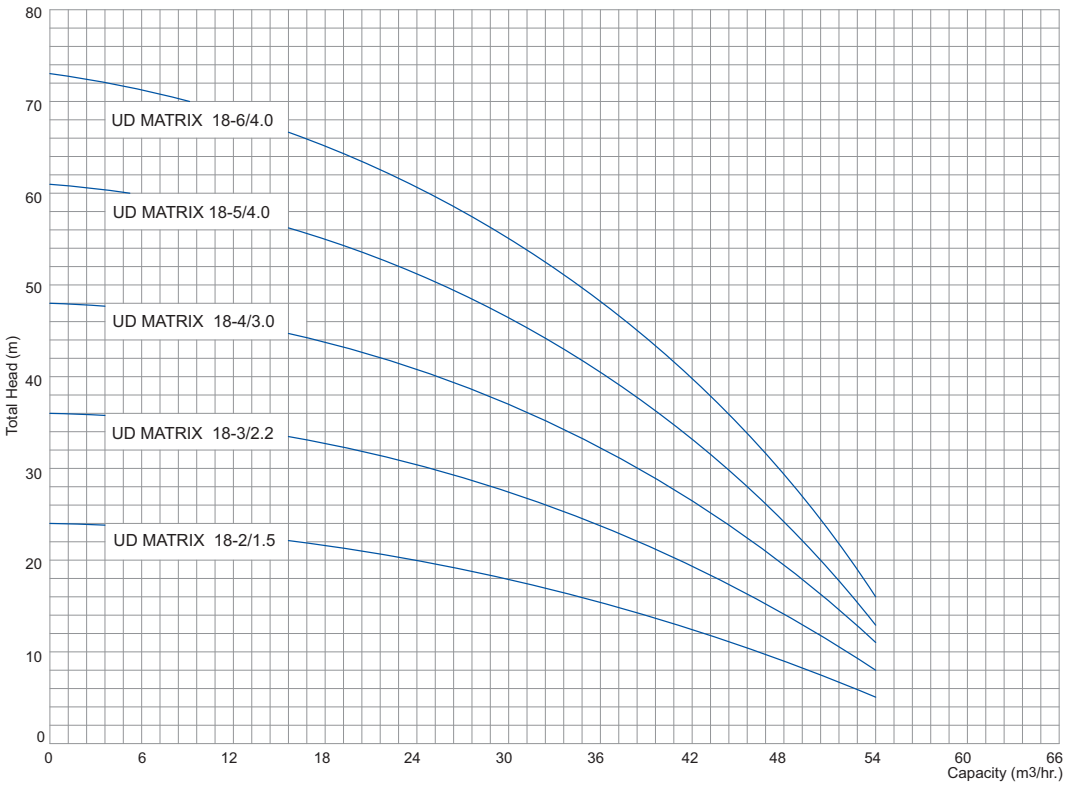


SELECTION GUIDE

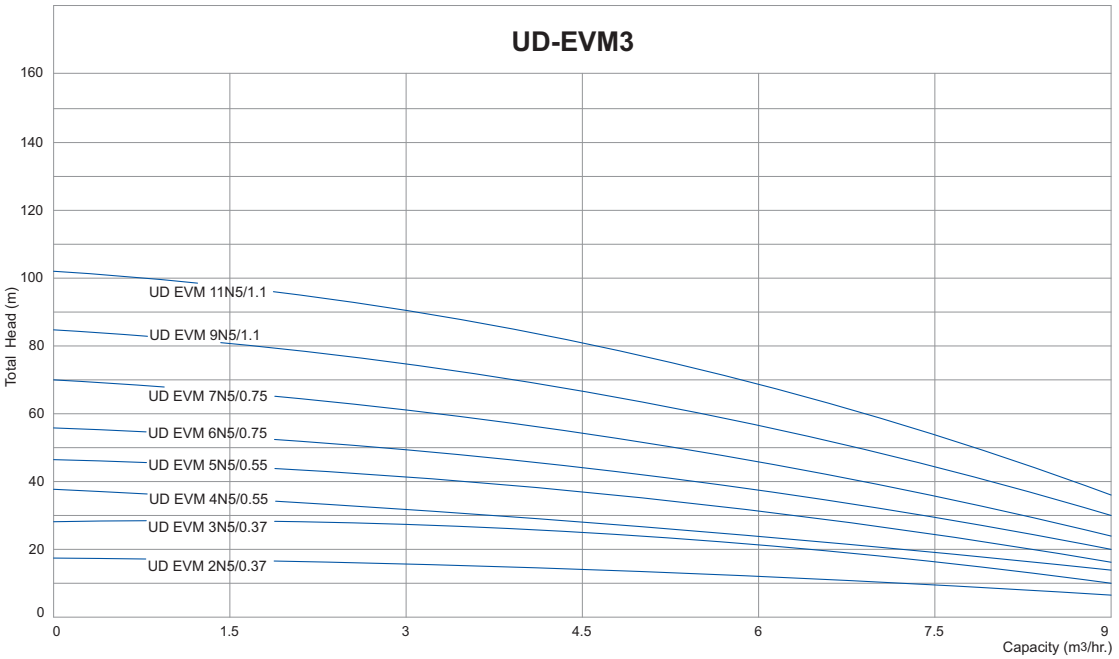
UD MATRIX 10
CURVES 2 POLES 50 Hz

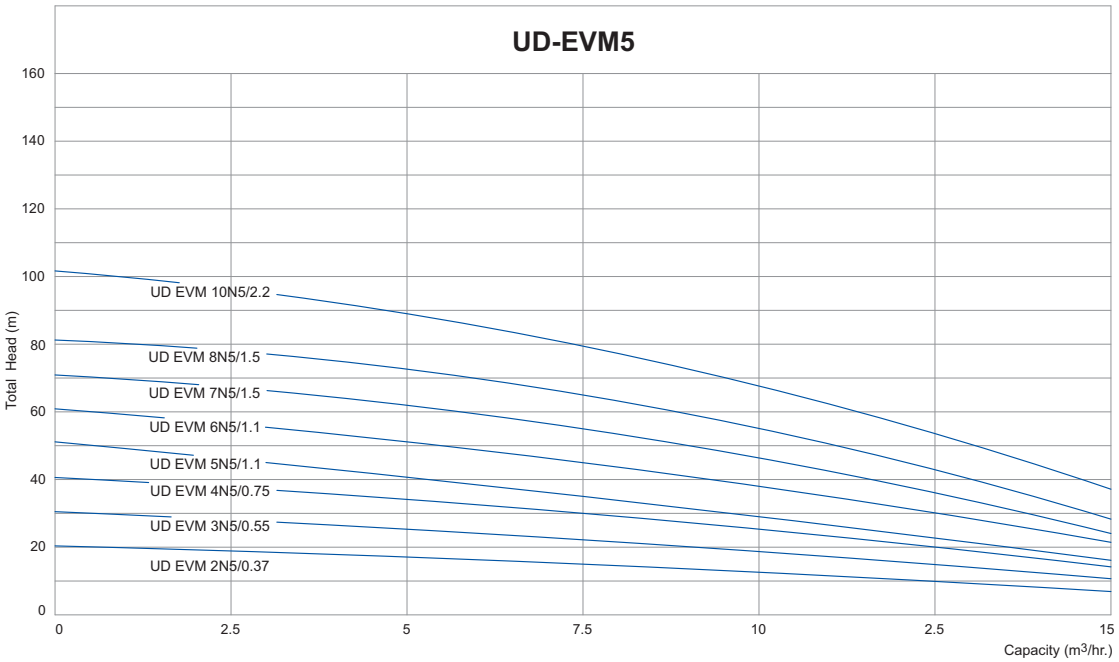


UD MATRIX 18
CURVES 2 POLES 50 Hz

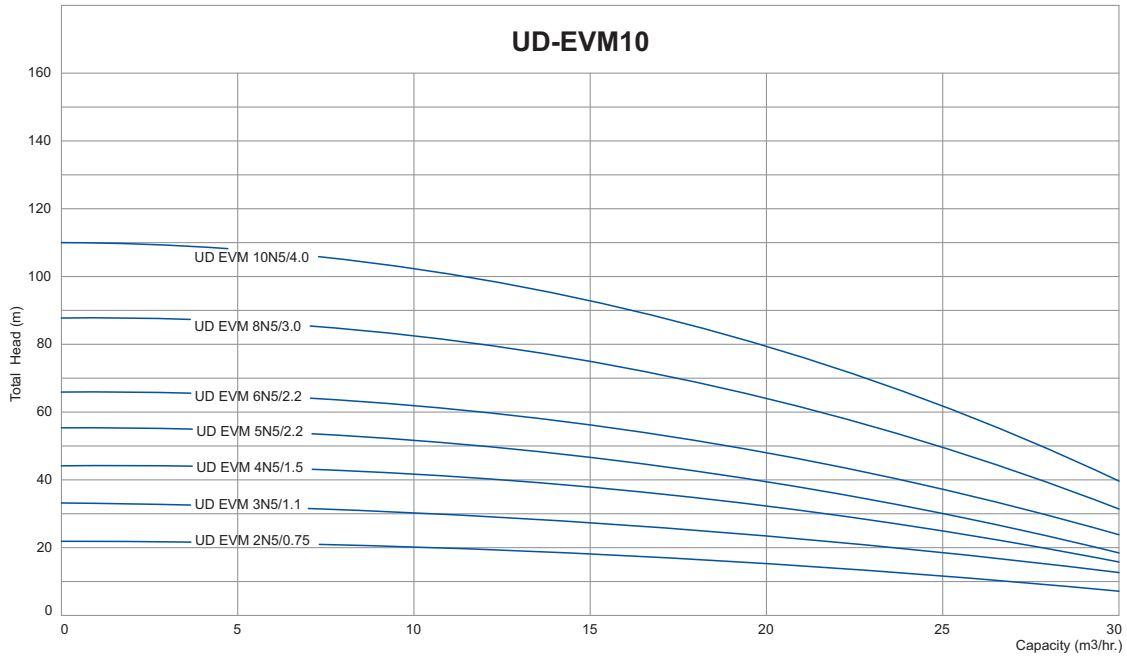


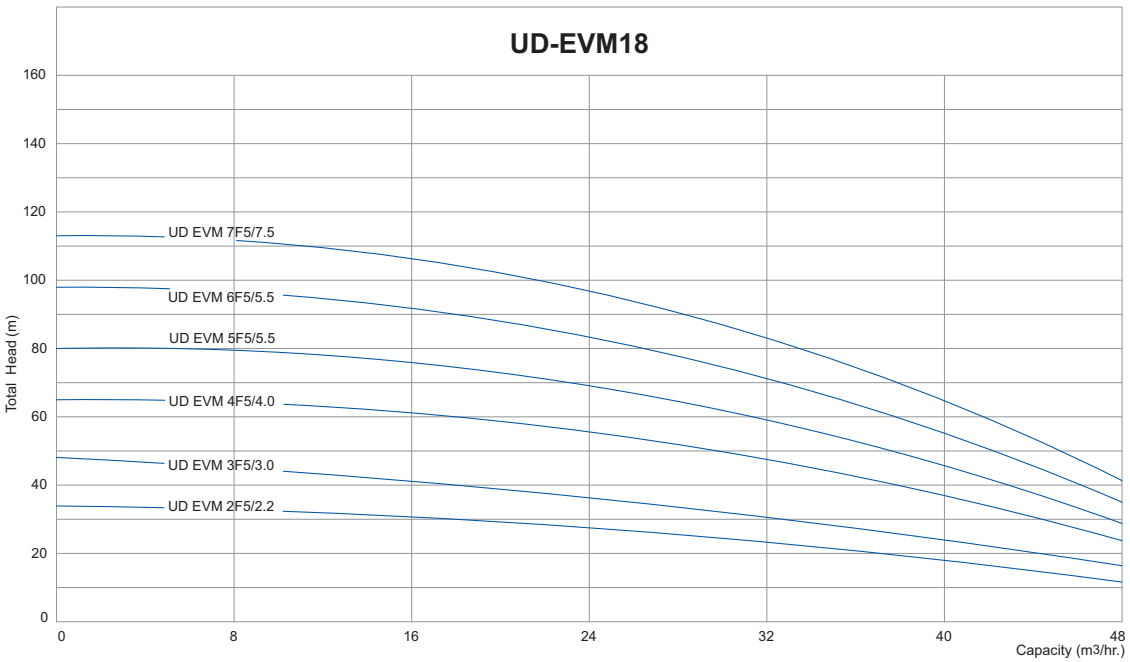
SELECTION GUIDE



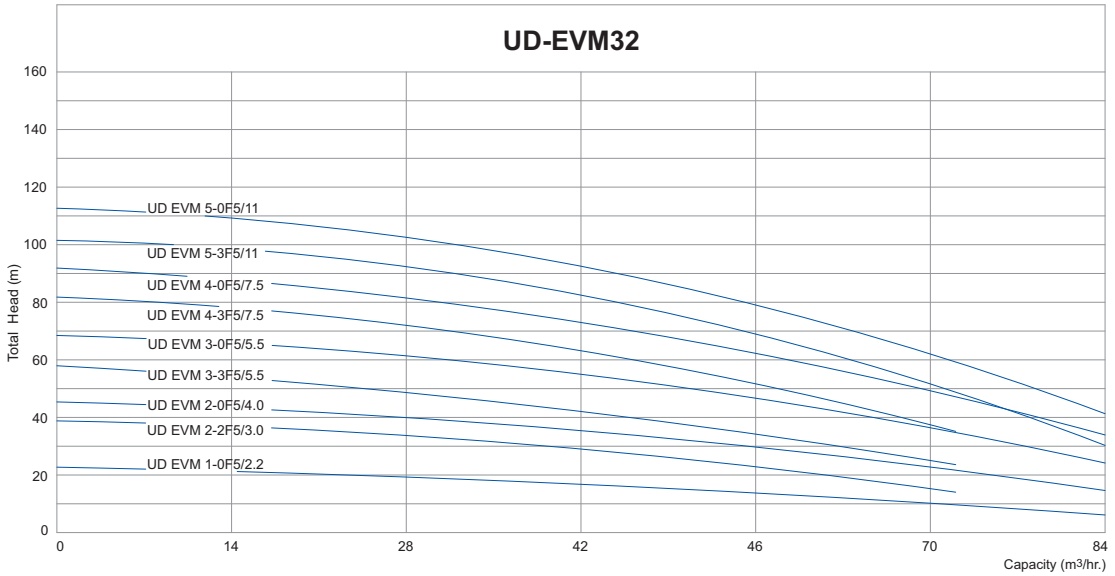


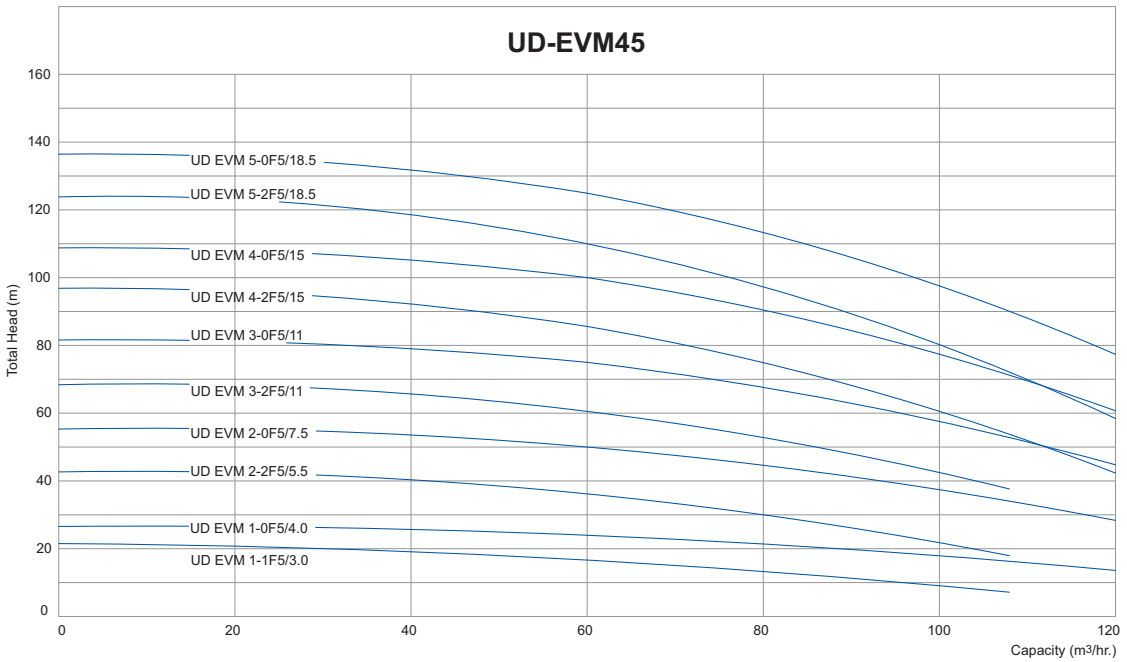
SELECTION GUIDE



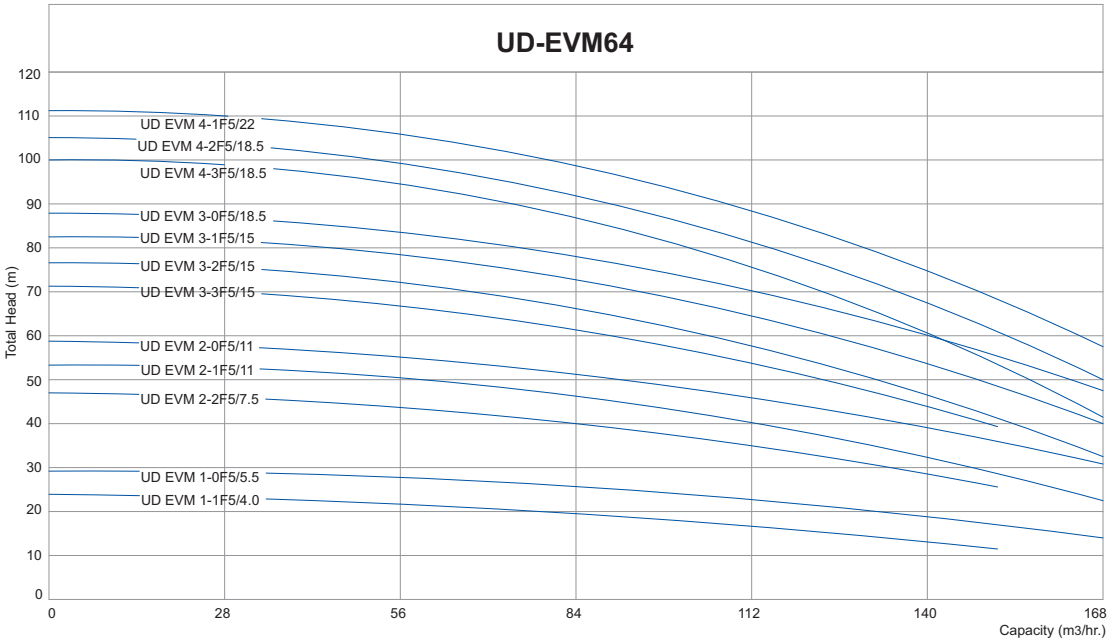


SELECTION GUIDE

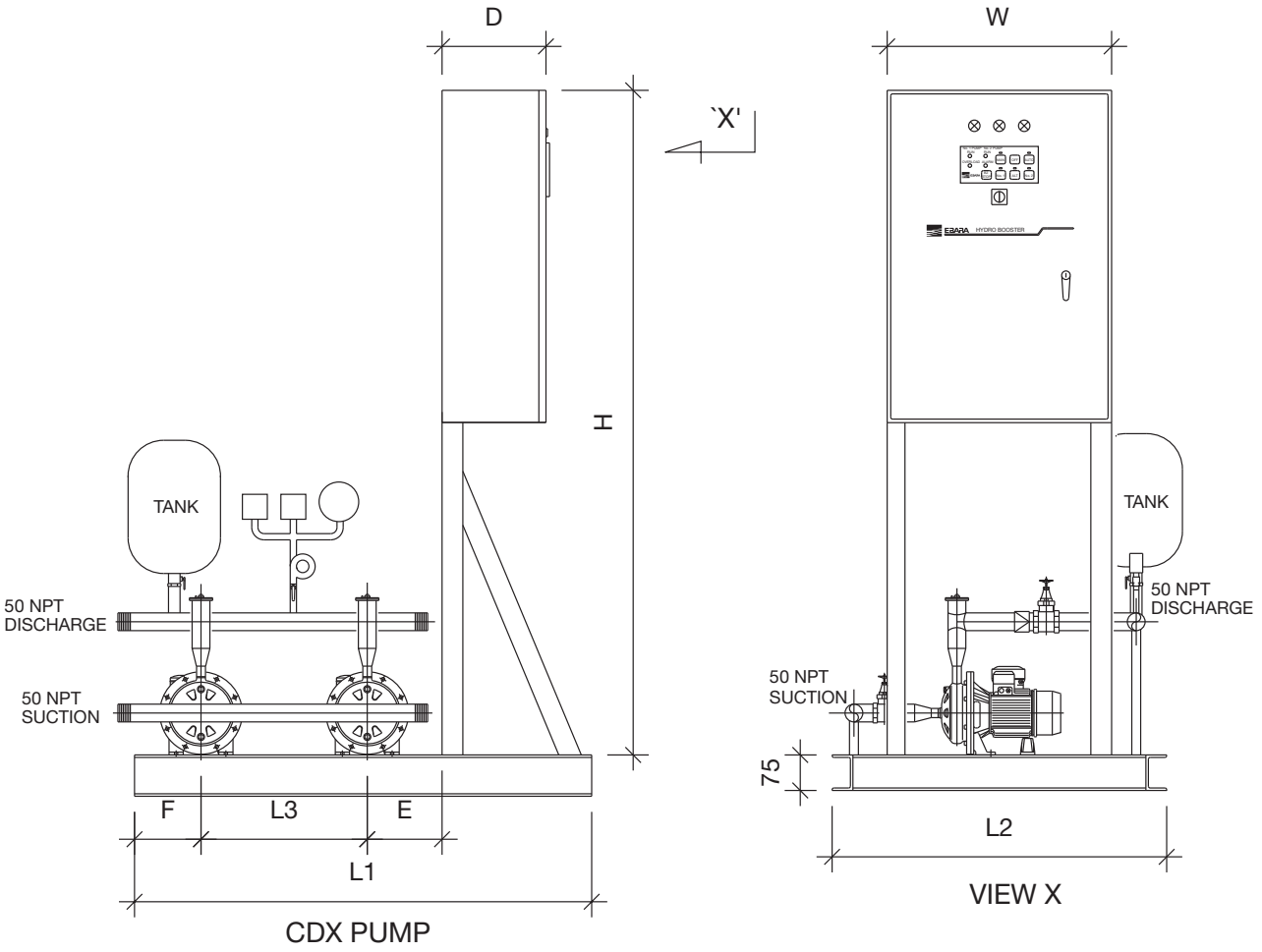




SELECTION GUIDE

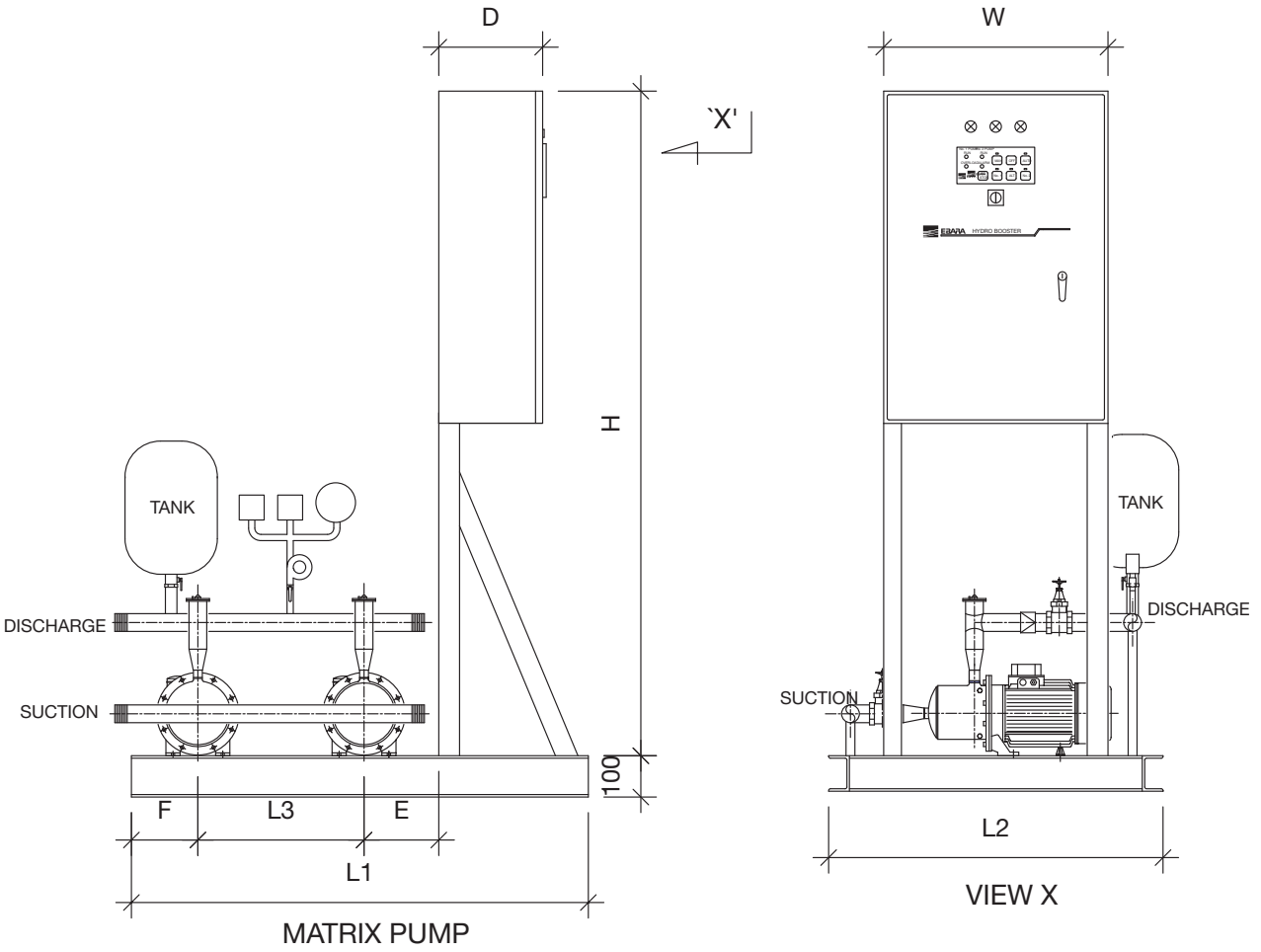


DIMENSIONAL DRAWING UD SYSTEM (CDX)



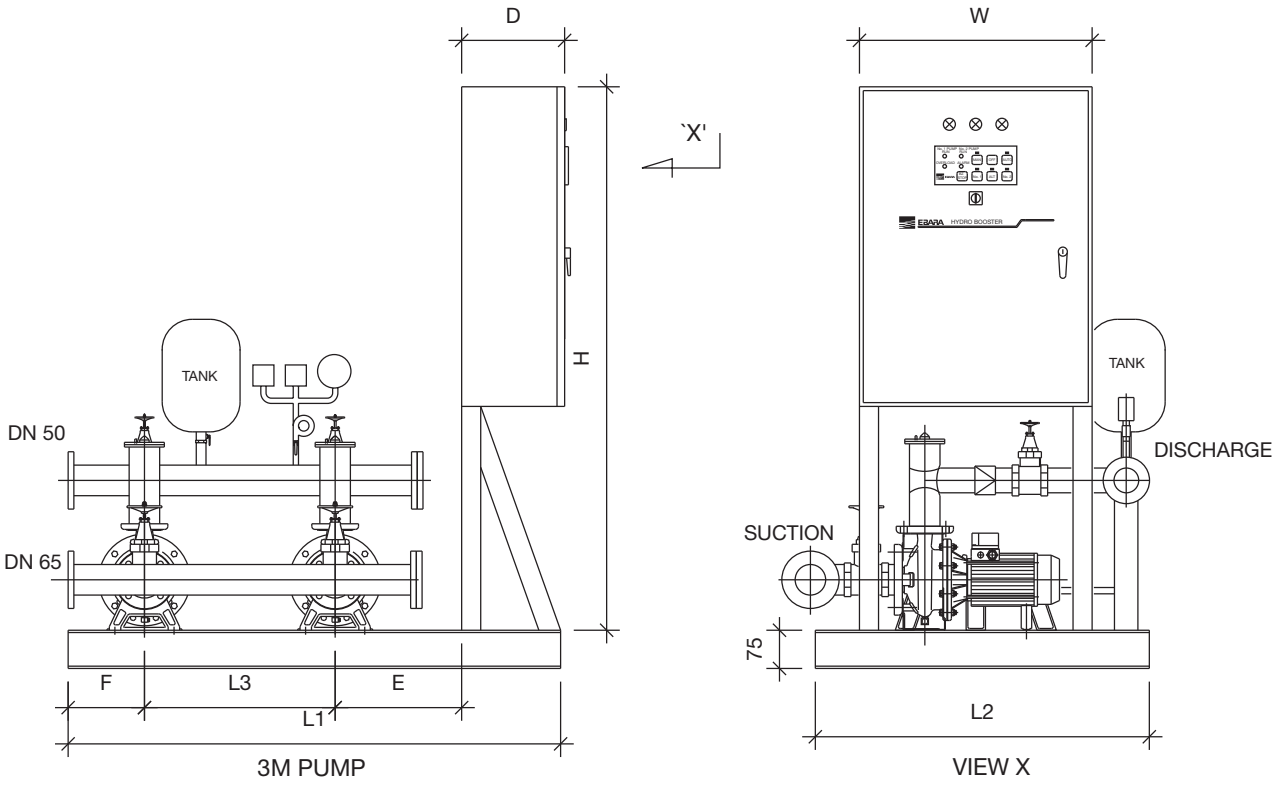
DIMENSION / MODEL	D mm	W mm	H mm	L1 mm	L2 mm	L3 mm	E mm	F mm	TANK LITER	PIPE CONNECTION
UD-2 x CDX	200	450	1525	1030	860	350	250	180	18	NPT

DIMENSIONAL DRAWING UD SYSTEM (MATRIX)



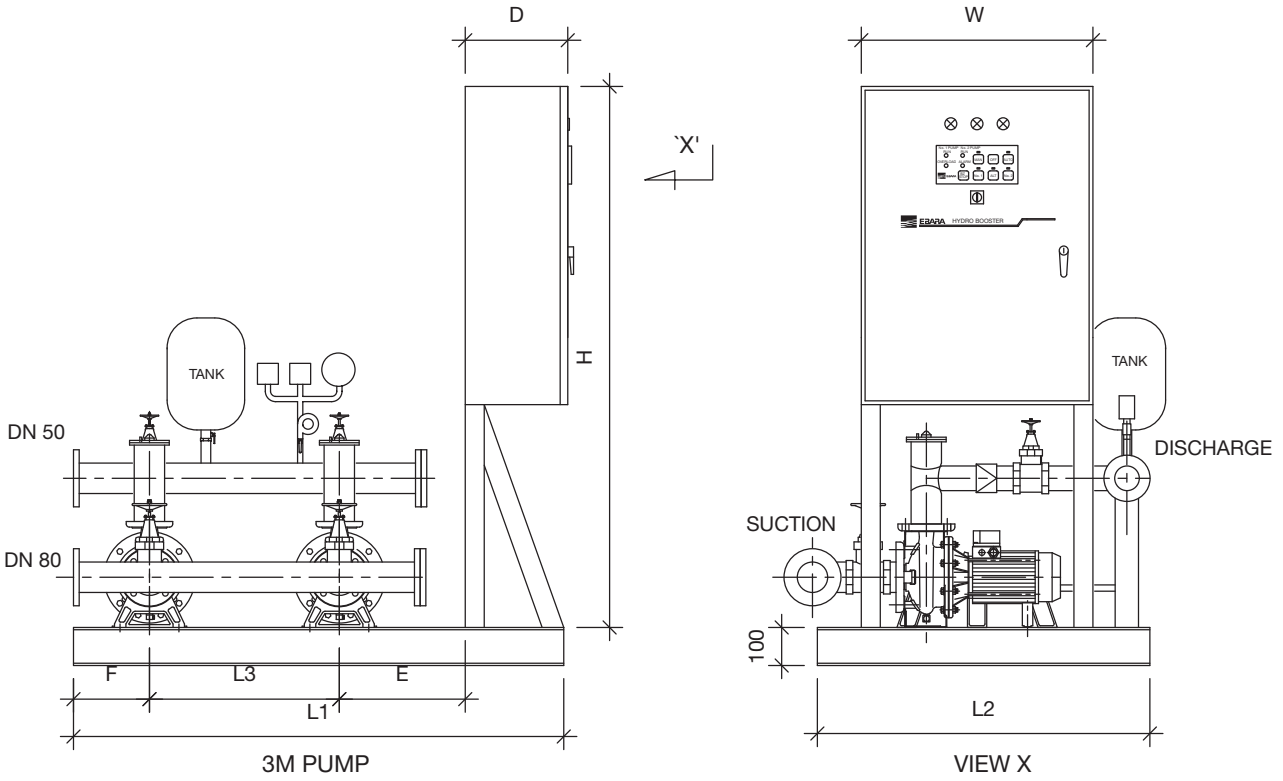
MODEL \ DIMENSION	D mm	W mm	H mm	L1 mm	L2 mm	L3 mm	E mm	F mm	TANK LITER	PIPE CONNECTION
UD-2 x MATRIX 3/5/10	200	450	1525	1030	860	350	250	180	18	50 NPT
UD-2 x MATRIX 18	200	450	1525	1080	910	350	250	180	24	75 NPT

DIMENSIONAL DRAWING UD SYSTEM (3M 32)



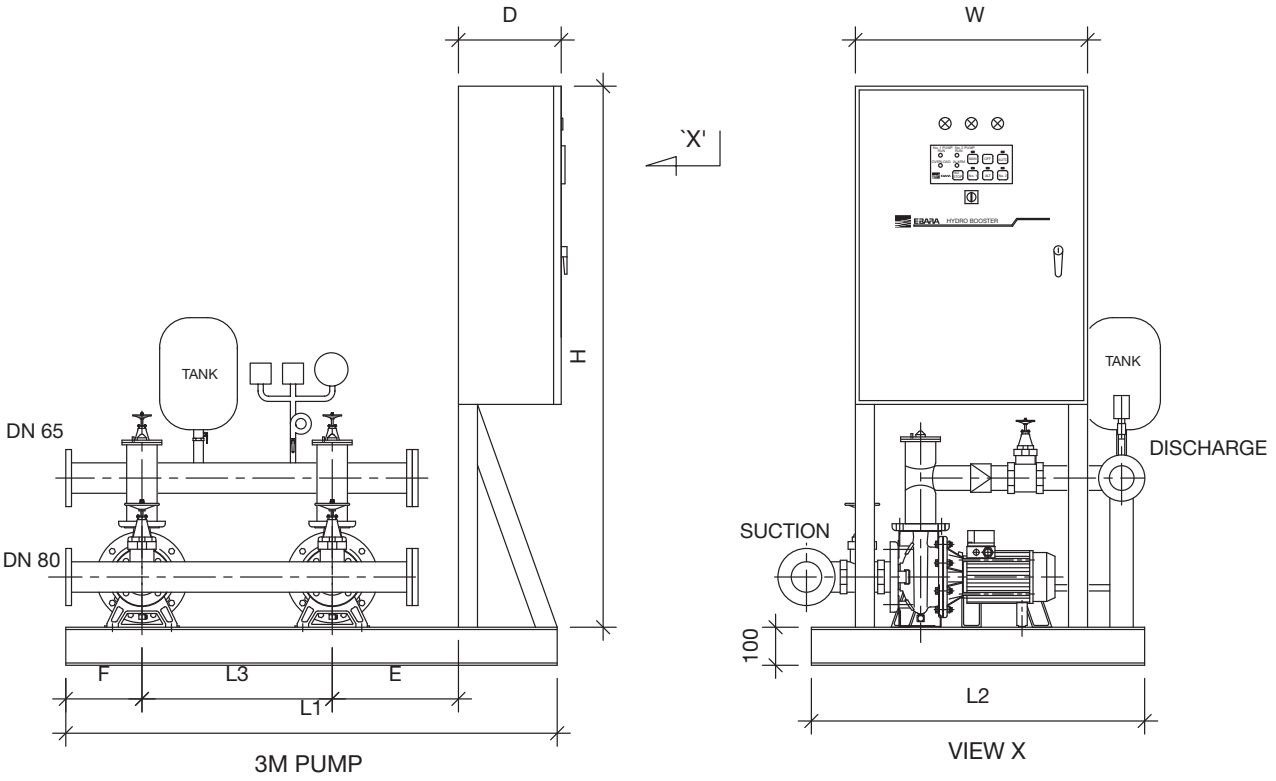
MODEL \ DIMENSION	D mm	W mm	H mm	L1 mm	L2 mm	L3 mm	E mm	F mm	TANK LITER	PIPE CONNECTION
UD-2 x 3M32	200	550	1525	1200	920	440	250	210	24	FLANGE

DIMENSIONAL DRAWING UD SYSTEM (3M 40)



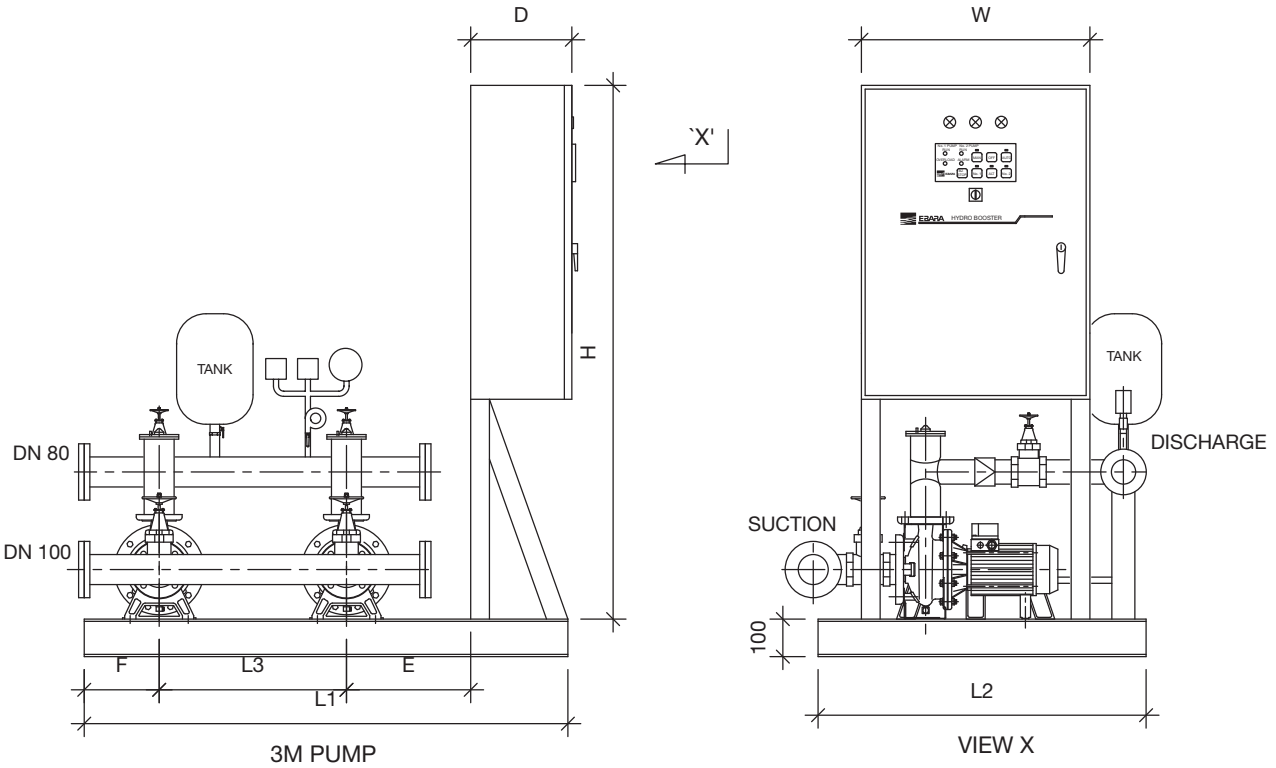
DIMENSION / MODEL	D mm	W mm	H mm	L1 mm	L2 mm	L3 mm	E mm	F mm	TANK LITER	PIPE CONNECTION
UD-2 x 3M40	200	550	1525	1460	1050	500	310	250	24	FLANGE

DIMENSIONAL DRAWING UD SYSTEM (3M 50)



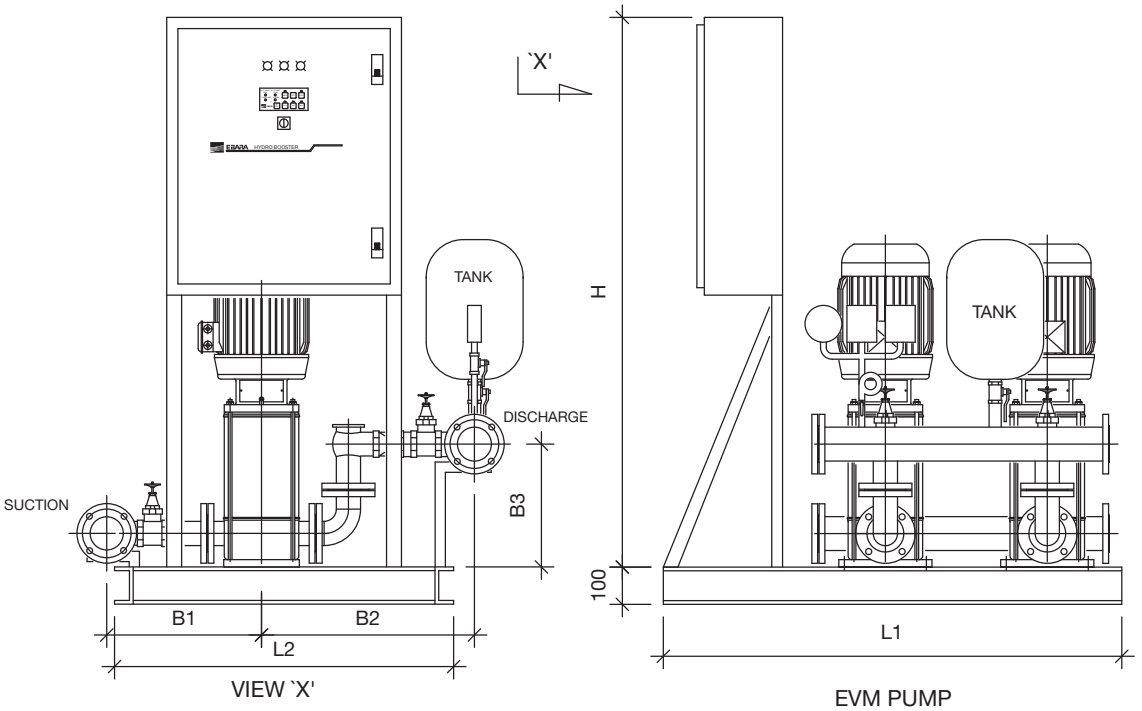
MODEL \ DIMENSION	D mm	W mm	H mm	L1 mm	L2 mm	L3 mm	E mm	F mm	TANK LITER	PIPE CONNECTION
UD-2 x 3M50	200	550	1525	1460	1050	500	310	250	24	FLANGE

DIMENSIONAL DRAWING UD SYSTEM (3M 65)



DIMENSION / MODEL	D mm	W mm	H mm	L1 mm	L2 mm	L3 mm	E mm	F mm	TANK LITER	PIPE CONNECTION
UD-2 x 3M65	200	550	1525	1460	1050	500	310	250	24	FLANGE

DIMENSIONAL DRAWING UD SYSTEM (EVM)



MODEL / DIMENSION	B1 mm	B2 mm	B3 mm	H mm	L1 mm	L2 mm	TANK LITER	SUCTION MANIFOLD mm	DISCHARGE MANIFOLD mm	PIPE CONNECTION
2UD-EVM 3	400	700	350	1525	1030	880	18	50	50	NPT
2UD-EVM 5	400	700	350	1525	1030	880	18	50	50	NPT
2UD-EVM 10	420	720	350	1525	1100	1040	24	65	65	NPT
2UD-EVM 18	420	720	350	1525	1245	1040	24	80	80	FLANGE
2UD-EVM 32	440	740	400	1525	1755	1360	100	100	100	FLANGE
2UD-EVM 45	440	740	400	1525	1860	1530	100	150	150	FLANGE
2UD-EVM 64	440	740	400	1525	1860	1530	100	150	150	FLANGE