

DUCA DOMESTIC PORTFOLIO

DUCA®

COSMO+



TECHNICAL DATA SHEET

COSMO+

Application

For domestic hot water system such as mix water underfloor heating system, air energy hot water circulation system, solar hot water circulation system and family hot, cold water pressurization circulation, etc.



Main features

- 'A' Nominal energy efficiency lowest power consumption
- Permanent magnet aluminium die-cast housing motor, intelligent frequency control
- Compact design with control box integrated in the pump head
- Proportional pressure, constant pressure, constant speed mode
- Low noise operation

Working condition

- Maximum Ambient Temperature: +40 °C
- Protection Level: IP44
- Mains Connection: 220V~240V /50hz
- Insulation Class: H
- Pumped Liquid Properties:
 - Clean, Solids and Mineral Oil Free,
 - Non-toxic, Chemically Neutral,
 - Close to Water Features

EEl ≤ 0.21

iPWM





COSMO+ 25/32-8

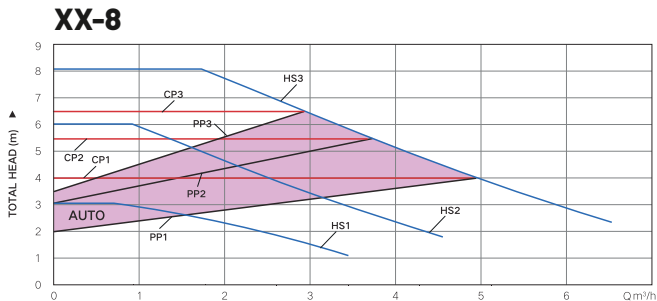
Nameplate

DUCA®		Worimex Co. Istanbul, Turkey		COSMO+	
H(m)	P _{I(W)}	I(A)	Q(m ³ /h)		
Max. 8	150	1.6	7.5		
EEI ≤ 0.21 • 220-240V • 50/60Hz • 1.0MPa • Class F • TF95 • IP44 CE					

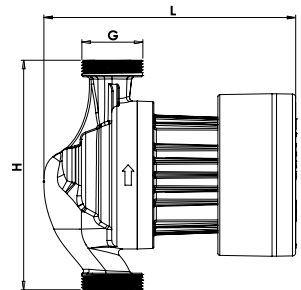
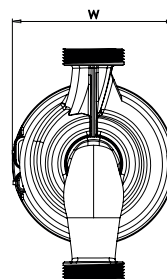
Max. Flow Rate
7,5 m³/h

Max. Head
8 m

Performance Curve



Dimensions



W 127 mm

L 197,5 mm

H 180 mm

EEI ≤ 0.21

iPWM

ErP
READY

CE RoHS
Compliant

TSE

Model Information

Model	Min/Max Temp (°C)	L (mm)	DN	P1 Max	Voltage (V)	Rated Current (A)	Union (G)
25-8-180	-2 to +110	180	DN25	120W	230	1.04	G1½ to G1
32-8-180	-2 to +110	180	DN32	120W	230	1.04	G2 to G1½



COSMO+ 25/32-10

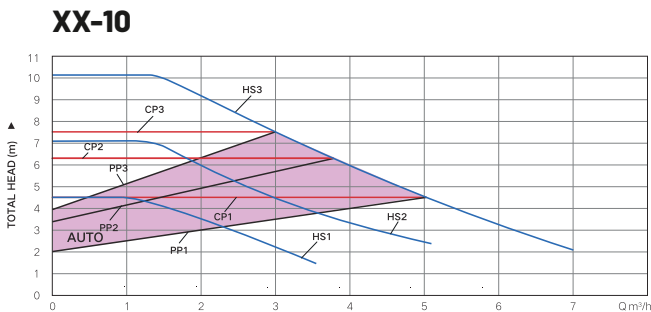
Nameplate

DUCA®		Worimex Co. Istanbul, Turkey		COSMO+	
H (m)	P _{1(W)}	I (A)	Q (m ³ /h)		
Max. 10	150	1.6	8		
EEI ≤ 0.21 • 220-240V • 50/60Hz • 1.0MPa • Class F • TF95 • IP44 CE					

Max. Flow Rate
8 m³/h

Max. Head
10 m

Performance Curve



EEI ≤ 0.21

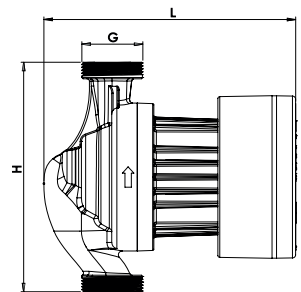
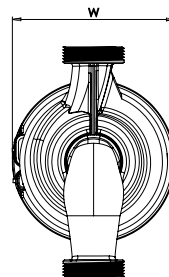
iPWM

ErP
READY

CE RoHS
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TSE

Dimensions



W 127 mm

L 197,5 mm

H 180 mm

Model Information

Model	Min/Max Temp (°C)	L (mm)	DN	P1 Max	Voltage (V)	Rated Current (A)	Union (G)
25-10-180	-2 to +110	180	DN25	150W	230	1.25	G1½ to G1
32-10-180	-2 to +110	180	DN32	150W	230	1.25	G2 to G1½



COSMO+ 25/32-12

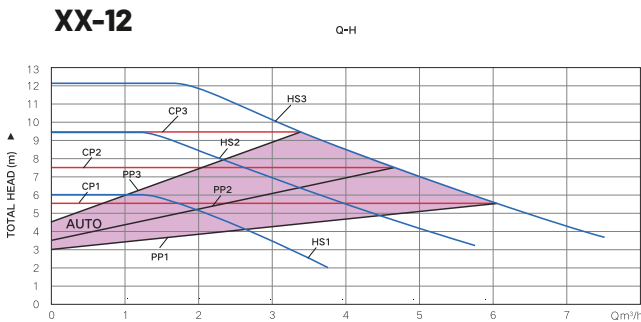
Nameplate

DUCA®		Worimex Co. Istanbul, Turkey		COSMO+	
	H(m)	P ₁ (W)	I _A (A)	Q (m ³ /h)	
Max.	12	180	1.6	8,5	
EEI ≤ 0.21 • 220-240V • 50/60Hz • 1.0MPa • Class F • TF95 • IP44 CE					

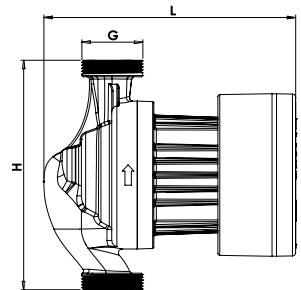
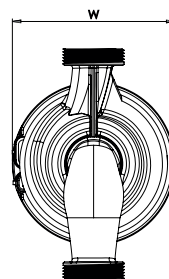
Max. Flow Rate
8,5 m³/h

Max. Head
12 m

Performance Curve



Dimensions



W 127 mm

L 197,5 mm

H 180 mm

EEI ≤ 0.21

iPWM

ErP
READY

CE RoHS
Compliant

TSE

Model Information

Model	Min/Max Temp (°C)	L (mm)	DN	P1 Max	Voltage (V)	Rated Current (A)	Union (G)
25-12-180	-2 to +110	180	DN25	180W	230	1.40	G1½ to G1
32-12-180	-2 to +110	180	DN32	180W	230	1.40	G2 to G1½



COSMO+ 25/32-18

Nameplate

DUCA®		Worimex Co. Istanbul, Turkey		COSMO+	
H(m)	P _{I(W)}	I(A)	Q (m ³ /h)		
Max. 18	260	1.6	11		
EEI ≤ 0.21 • 220-240V • 50/60Hz • 1.0MPa • Class F • TF95 • IP44 CE					

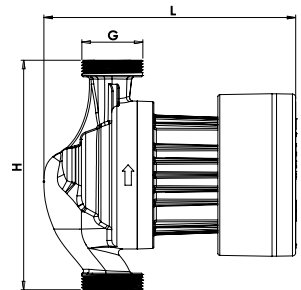
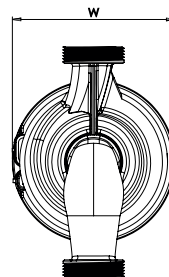
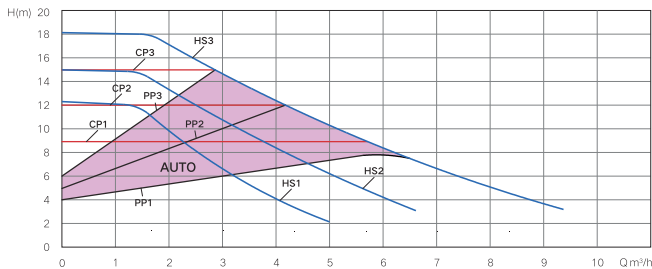
Max. Flow Rate
11 m³/h

Max. Head
18 m

Performance Curve

Dimensions

XX-18



EEI ≤ 0.21

iPWM

ErP
READY

CE RoHS
Compliant

TSE

W 127 mm

L 197,5 mm

H 180 mm

Model Information

Model	Min/Max Temp (°C)	L (mm)	DN	P1 Max	Voltage (V)	Rated Current (A)	Union (G)
25-18-180	-2 to +110	180	DN25	260W	230	1.90	G1½ to G1
32-18-180	-2 to +110	180	DN32	260W	230	1.90	G2 to G1½



COSMO+ 25/32-20

Nameplate

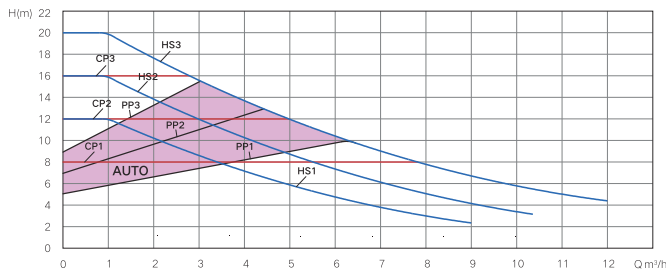
DUCA®		Worimex Co. Istanbul, Turkey		COSMO+	
H(m)	P _{1(W)}	I(A)	Q(m ³ /h)		
Max. 20	350	1.6	12		
EEI≤0.21 • 220-240V • 50/60Hz • 1.0MPa • Class F • TF95 • IP44 CE					

Max. Flow Rate
12 m³/h

Max. Head
20 m

Performance Curve

XX-20



EEI ≤ 0.21

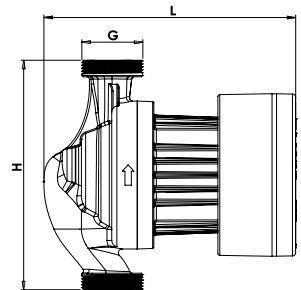
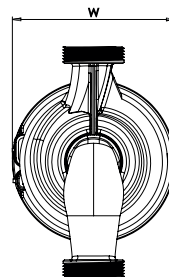
iPWM

**ErP
READY**

CE RoHS
Compliant

TSE

Dimensions



W 127 mm

L 197,5 mm

H 180 mm

Model Information

Model	Min/Max Temp (°C)	L (mm)	DN	P1 Max	Voltage (V)	Rated Current (A)	Union (G)
25-20-180	-2 to +110	180	DN25	350W	230	2.10	G1½ to G1
32-20-180	-2 to +110	180	DN32	350W	230	2.10	G2 to G1½

PWM Mode

Pump driver board have been working in a two control modes that PWM and gear mode. In PWM mode pump speed change as a function of PWM input profile. When there is no PWM signal, pump driver board have been working in a gear mode. In gear mode, pump runs in five different speed. On the other hand pump driver board has a five LEDs for give information about operation status and error conditions.

Pump driver board has a two PWM signal that input PWM signal and output PWM. Input PWM signal works in 1 - 4 kHz range and changes the pump speed. Output PWM signal work as a feedback signal and it is fixed at 75 Hz. Output PWM give a information about the pump output power.

Optocoupler Isolation	AVAILABLE
PWM Output Frequency	75 Hz
PWM Input Frequency	1 - 4 kHz
Input voltage high level U_{IH}	4.0 - 24V
Input voltage low level U_{IL}	< 1V
High level input current I_H	3.5 mA - 10 mA
PWM adjustable range	0 - 100 %
Signal polarity	Fixed
Signal line length	< 3m
Rise and fall time	< T/1000

Table 2. PWM signal characteristics

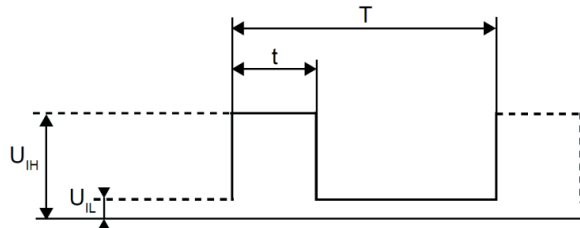


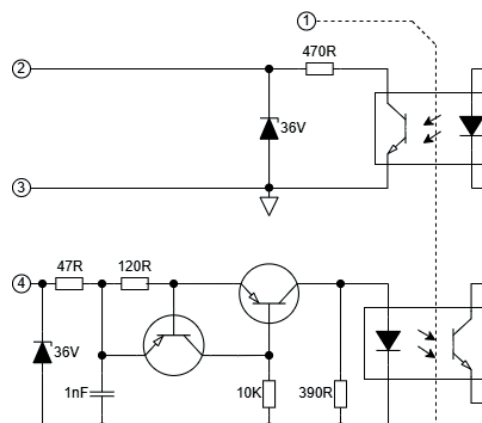
Figure 3. PWM signal characteristics waveform

PWM Interface

The PWM interface consists of an electronic part that connects the external control signal in isolation to the microcontroller of the pump driver board. In addition, the interface allows the user to avoid contact with hazardous voltage if the signal touches the wires when power is connected to the pump.

Position	Description
1	Galvanic Isolation
2	PWM Output
3	ISO GND
4	PWM Input

Table 3. Interface schematic description



PWM Input Signal Profile

PWM mode operating principle is given in the picture below. In PWM Mode, the pump can be driven at different speeds. When the PWM signal duty cycle value is low, circulating pump rotate high speed because if the PWM connection is damaged the circulating pump must be run at maximum speed to transfer heat from primary heat exchanger. With the help of hysteresis, the pump can be prevented from switching off and on continuously at low speeds.

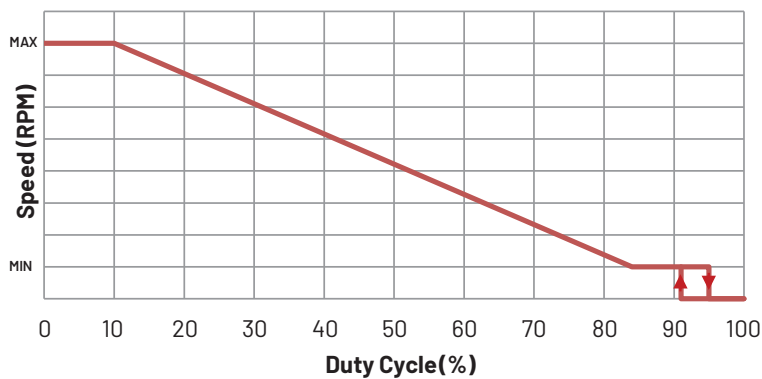


Figure 5. Input PWM waveform

Input PWM Duty Cycle (%)	Pump Driver Board Status
0	There is no PWM signal send to the pump driver board. So in this status pump driver have been work on a gear mode.
0 < Duty ≤ 10	Pump runs in maximum speed.
10 < PWM ≤ 84	Pump speed is linearly drops from the maximum speed to minimum speed.
84 < PWM ≤ 91	Pump runs in minimum speed.
91 < PWM < 95	In this range, hysteresis is used to stop the pump above 95 and drive it at minimum speed when it falls below 91 .
95 ≤ PWM ≤ 100	Pump stops running, Standby

Table 4. Input PWM description

PWM Output Signal Profile

The PWM output signal offers information below that about pump driver board.

- Current power consumption
- Warning
- Alarm
- Operating status

Position	Value	Description
X Axis	-	Output power consumption (W)
Y Axis	-	PWM output signal percentage (%)
A	%95	Standby, Pump stop
B	%90	Alarm Stop : Blocked pump
C	%85	Alarm Stop : Electric fault
D	%75	Warning
E	%0-%70	Slope: 1% / watt PWM signal
F	%70	Saturation at 70 W

Table 5. Output PWM description

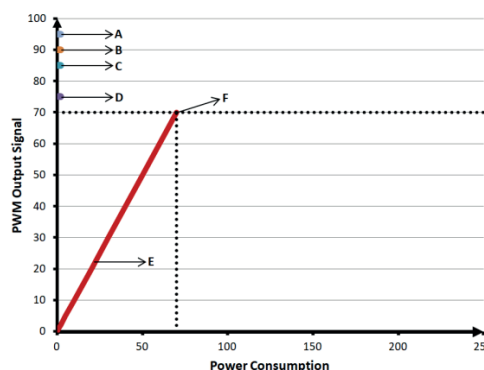


Figure 6. Output PWM Waveform

User interface



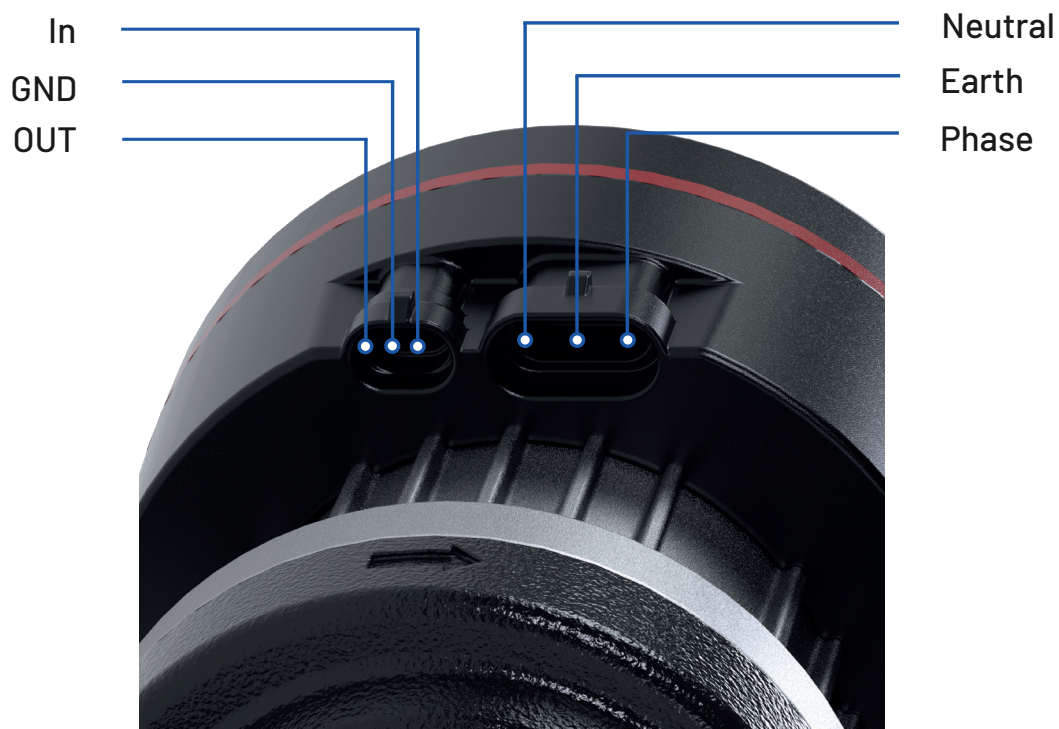
Button Function

Pressing Times	Description	Displayer icon
0	Autoadaptation	AUTO
1	Min. proportional pressure curve	△ + I
2	Medium proportional pressure curve	△ + II
3	Max. proportional pressure curve	△ + III
4	Min. Constant pressure curve	▽ + I
5	Medium Constant pressure curve	▽ + II
6	Max. Constant pressure curve	▽ + III
7	Constant speed curve, speed I	I
8	Constant speed curve, speed II	II
9	Constant speed curve, speed III	III

Fault Display

Error code	Cause of issue	Troubleshooting method
No display	Blown fuse in the device	Unplug the water pump, remove the main circuit failure, and replace the fuse; if the main circuit has no failure, replace the pump.
	Breaker open	Unplug the water pump, remove the main circuit fault, turn on the circuit breaker; if the main circuit is not faulty, replace the pump. Troubleshoot the main circuit and replace the pump.
	Pump is not working	Troubleshoot and replace failed parts or pumps.
E1/ (E-)	Pump rotor stuck	Disassemble the pump body to remove mechanical jams and remove debris or scale. Or replace failed parts, pumps. Troubleshoot and replace failed parts or pumps.
E2	Lack of phase	Troubleshoot the main circuit and replace the pump.
E3	Voltage is too high or too low	Check whether the power supply is within the specified range, adjust the power supply voltage.
E4	Short circuit/over current	Troubleshoot and replace failed parts or pumps.
E5	Temperature protection	IPM module temperature is too high, check the circuit board or heat dissipation failure, repair or replace the pump.
E6	Hardware fault	Troubleshoot the circuit board and replace the circuit board or pump.
E7	Dry-Run Fault	If the system is short of water or the pump runs without load for more than 1 minute, check the water inlet pressure of the pump

Cable Connections



Pwm/Mini Superseal Cable



Power/Superseal Cable