



**Pool & Spa
Products Division**



Eco-Flow - C

VARIABLE FREQUENCY DRIVE

for Commercial Swimming Pools &
Water Feature Pumps

We don't make pool pumps, we make them more energy efficient!

With more than 80 years of combined knowledge in monitoring and controlling pumps, H₂flow is the only manufacturer in the pool industry that is totally dedicated to this technology.

At H₂flow we pride ourselves on offering first class products and an unparalleled knowledge relating to applying VFD's to pumps.

Standard Features

- Standard Aquatic Controller
- Unparalleled Construction (NEMA 12)
- Constant Flow Feature
- Pump Protection (Run-Dry, Dead Head, etc.)
- Elimination of Water Hammer via Soft-Start / Stop
- Single Phase to 3 Phase Conversion (NEMA 1)

TECHNICAL DATA SHEET

Introduction

Eco-Flow - C is an electronic system designed to provide variable speed control for Commercial Swimming Pools and Water Features. Pumps from 1 to 1500 HP can be controlled.

Traditional methods of flow control have been via control valves installed in the discharge line of the pump or, at best, via a 2-Speed Motor. Pumps are often over-sized and deliver far too much flow if run wide open and at full speed. Using a flow control valve to partially dead head the pump not only wastes energy but can often reduce the pump's life. Using a 2-speed motor provides very limited control and may reduce the flow to a point where the State's mandated turnover rate is not reached.

Eco-Flow - C's 'Variable Frequency Drive' (VFD) technology provides the operator the ability to not only fine tune the pump's speed to exactly what's required but can also be configured to automatically adjust the pump's speed to maintain a constant flow rate - even as the filter starts to become dirty and where flow would normally decrease.

Adjusting the pump's speed to the exact flow rate required will:

1. Significantly reduce consumed electrical energy
2. Maintain a more even flow and improve chemical application / dispersion
3. Reduce equipment wear
4. Reduce operating noise
5. Ensure State mandated turnover rates are met

Configurable...

Eco-Flow - C is a configurable system that can be customized to meet the exact needs of any given pool or water feature.

In its simplest format (NEMA 1 version), the system can be secured to a wall in a clean, dry room and electrically connected to the supply and pump. Where the Pool Equipment room has an environment that could contain chemical gases, a NEMA 12 version is available.

In its NEMA 1 or 12 configuration, the Eco-Flow - C includes a very powerful integrated Controller with a real time clock. Operator control and set up will be via the Controller's Liquid Crystal Display and Keypad. The Controller will facilitate:

1. Setting a fixed pump speed that will be maintained 24/7
2. Setting multiple pump's speeds at different times of the day
3. Setting automatic pump speed control based on feedback from a pressure or flow sensor installed after the filter
4. Manual or automatic control of the pump's speed for filter backwashing
5. Electronic lockout of all set parameters

Optional features including an integrated Electrical Bypass and Lightning Arrestor can be specified.

VFD NEMA Rating	Environment
12	Indoor, Chemical Gas present

3-Phase input / 3-Phase output

NEMA 12 - Wall mounted VFD plus Aquatic Controller in a separate enclosure



NEMA 12 VFD

Frame Size	Model	Max Motor HP		VFD Max Amps
		208 / 230V	480V	
A	EF-C-04-12-4		2	4
A	EF-C-08-12-4		5	8
A	EF-C-13-12-4		7.5	13
A	EF-C-26-12-4		15	26
A	EF-C-31-12-4		25	31
A	EF-C-46-12-4		30	46
B	EF-C-60-12-4		40	60
B	EF-C-73-12-4		50	73
A	EF-C-04-12-2	1		4
A	EF-C-08-12-2	2		8
A	EF-C-13-12-2	3		13
A	EF-C-26-12-2	7.5		26
A	EF-C-31-12-2	10		31
A	EF-C-46-12-2	15		46
B	EF-C-60-12-2	20		60
B	EF-C-73-12-2	25		73

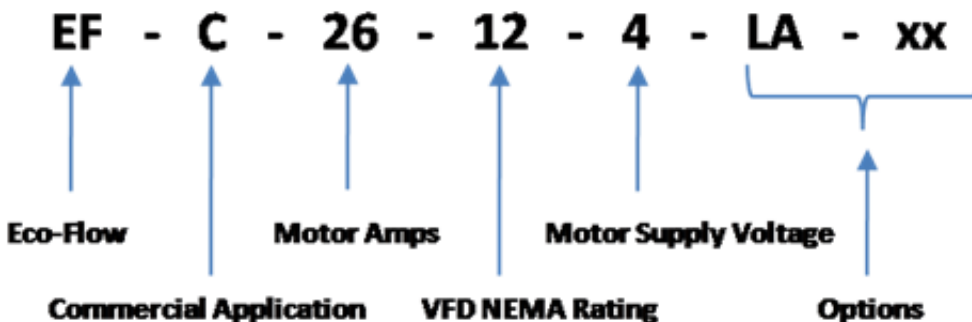
System Options

Part Number	Description
PS-30	Pressure Sensor, 0-30psi, 1/4"NPT male thread and with 4-20mA output and 10' cable
PS-100	Pressure Sensor, 0-100psi, 1/4"NPT male thread and with 4-20mA output and 10' cable
LA	Lightning Arrestor
BP-A	NEMA 12 Bypass Panel for Frame Size A
BP-B	NEMA Bypass Panel for Frame Size B

Notes:

1. If a Bypass Panel is purchased, the Aquatic Controller will be mounted in its door
2. Pump Motor must have a minimum Class F insulation

Part Number identity:



Eco-Flow Controller

VFD NEMA Rating	Environment
1	Indoor, no Chemical Gas present

3-Phase input / 3-Phase output

NEMA 1 - Wall mounted VFD plus Aquatic Controller in a separate enclosure

Frame Size	Model	Max Motor HP		VFD Max Amps
		208 / 230V	480V	
A	EF-C-04-1-4		2	4
A	EF-C-08-1-4		5	8
A	EF-C-15-1-4		7.5	12
A	EF-C-22-1-4		15	24
A	EF-C-37-1-4		25	39
A	EF-C-40-1-4		30	45
A	EF-C-04-1-2	1		5
A	EF-C-08-1-2	2		8
A	EF-C-15-1-2	3		12
A	EF-C-22-1-2	7.5		24
A	EF-C-37-1-2	10		32
A	EF-C-40-1-2	15		46
A	EF-C-55-1-2	20		60
A	EF-C-75-1-2	25		74



NEMA 1 VFD

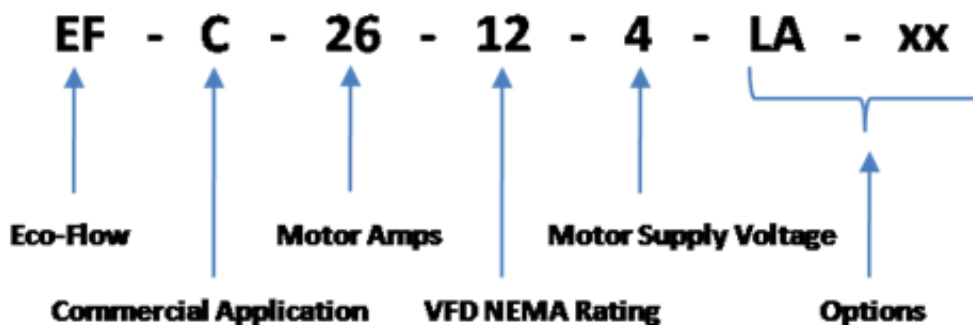
System Options

Part Number	Description
PS-30	Pressure Sensor, 0-30psi, 1/4"NPT male thread and with 4-20mA output and 10' cable
PS-100	Pressure Sensor, 0-100psi, 1/4"NPT male thread and with 4-20mA output and 10' cable
LA	Lightning Arrestor
BP-A	NEMA 12 Bypass Panel for Frame Size A
BP-B	NEMA Bypass Panel for Frame Size B

Notes:

1. If a Bypass Panel is purchased, the Aquatic Controller will be mounted in its door
2. Pump Motor must have a minimum Class F insulation
3. Warranty invalidated if NEMA 1 unit used in Chemical gas area

Part Number identity:



Eco-Flow Controller

VFD NEMA Rating	Environment
1	Indoor, no Chemical Gas present

1-Phase input / 3-Phase output

NEMA 1 - Wall mounted VFD plus Aquatic Controller in a separate enclosure

Model	Supply Voltage	Motor HP	Input Phases
EF-C-01-2-1-3	200-240	1	1
EF-C-02-2-1-3	200-240	2	1
EF-C-03-2-1-3	200-240	3	1
EF-C-05-2-1-3	200-240	5	1
EF-C-07-2-1-3	200-240	7.5	1
EF-C-10-2-1-3	200-240	10	1
EF-C-15-2-1-3	200-240	15	1



NEMA 1 VFD

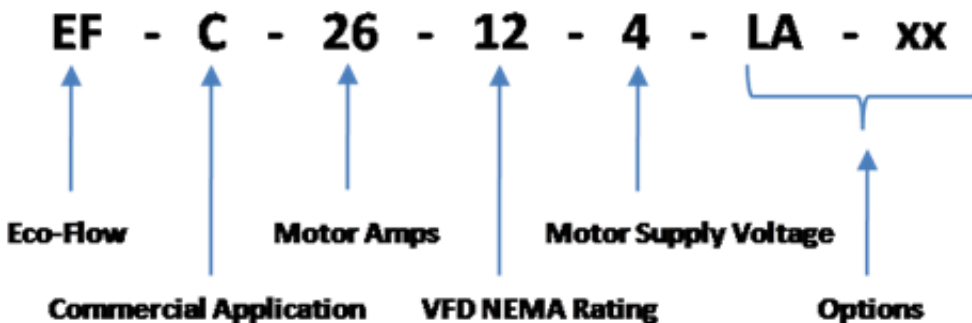
System Options

Part Number	Description
PS-30	Pressure Sensor, 0-30psi, 1/4"NPT male thread and with 4-20mA output and 10' cable
PS-100	Pressure Sensor, 0-100psi, 1/4"NPT male thread and with 4-20mA output and 10' cable
LA	Lightning Arrestor

Notes:

1. If a Bypass Panel is purchased, the Aquatic Controller will be mounted in its door
2. Pump Motor must have a minimum Class F insulation
3. Warranty invalidated if NEMA 1 unit used in Chemical gas area

Part Number identity:



Eco-Flow Controller

Configuration Check Sheet

Important Note: Eco-Flow - C is available in either a NEMA 12 or NEMA 1 configuration. The installation environment is critical to the model to be supplied. Installing a NEMA 1 unit into a Pool Equipment Room that has a possible presence of Chemical Gases, will invalidate the product's warranty.

1. Where is Eco-Flow going to be installed?

	NEMA 12
	NEMA 1

Indoor equipment room. Possibility of chemical gases present

Indoor equipment room. Clean, dry and free of chemical gases

2. Supply Voltages and number of phases

3 Phase, 460 / 480V

3 Phase, 208 / 230V

1 Phase, 208/230V / (NEMA 1 only and no Bypass option)

3. Pump Speed Control method

Fixed Speed or two different speeds based on time of the day

Constant Flow. Requires the inclusion of a Pressure Sensor (see options) or customer supplied flow sensor

Note: Customer supplied flow Sensor must include a 4-20mA analog output.

4. Bypass (not applicable for single phase input applications)

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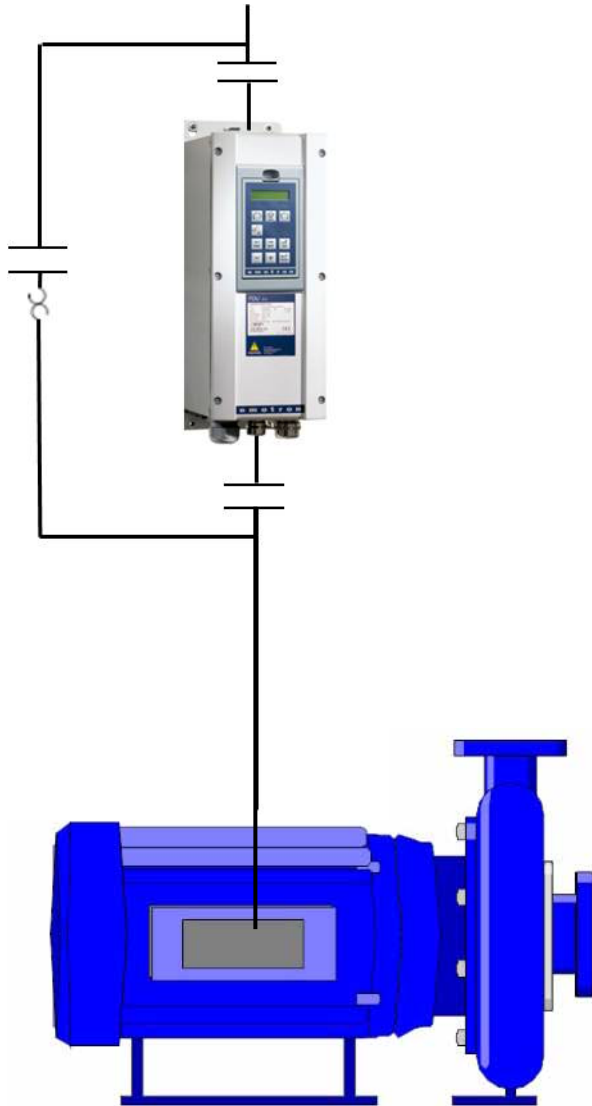
Comprises a separate NEMA 12 enclosure with three Contactors, one Motor Overload and a door mounted VFD / Bypass Selector Switch. When the selector switch is in the 'VFD' position, power is supplied to the motor from the VFD and speed control is available. When in the Bypass position, power will be supplied to the motor direct on line. Under these circumstances, the VFD can be removed for service. See Diagram on Page 7.

5. Lightning Arrestor

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When Lightning strikes the power supply feeding electronic equipment such as VFD's, it invariably destroys the equipment. A Lightning Arrestor is a device that can protect the equipment from such events. The Lightning Arrestor may need to be replaced after absorbing the energy of a strike.

Bypass Contactor Panel



Technical Data

Mains Supply Voltage:	NEMA 12: 208 -230V 3 Phase or 480V 3Ø (voltage to be noted on PO) NEMA 1: 200 - 230V 3 Phase or 480V 3Ø (voltage to be noted on PO) NEMA 1: 200 -230V 1 Phase
HP Range:	480V 3Ø input: 1 – 50 HP (NEMA 12) 480V 3Ø input: 1 – 30 HP (NEMA 1) 200 -230V 3Ø input: 1 - 25 HP 200 -230V 1Ø input: 1 - 15 HP Contact Factory for optional models up to 600 HP
Mains Frequency:	50 / 60 Hz (+/-10%)
Operating Ambient Temp:	32°F - 104°F (NEMA 12) 14°F - 122°F (NEMA 1)
Relative Humidity:	90% Relative Humidity or less
Max Operating Altitude:	3,281 ft without de-rating Above 3,281 ft, de-rate VFD rating by 1% for every 328 ft.
Environment:	Equipment must not operate outside of the environment specified in this document
Output Voltage:	0-Mains Supply Voltage
Output Frequency:	0.01-120 Hz
Rated Output Current:	Current rating of VFD, 120% overload for 1 minute
Efficiency at nominal load:	97%

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