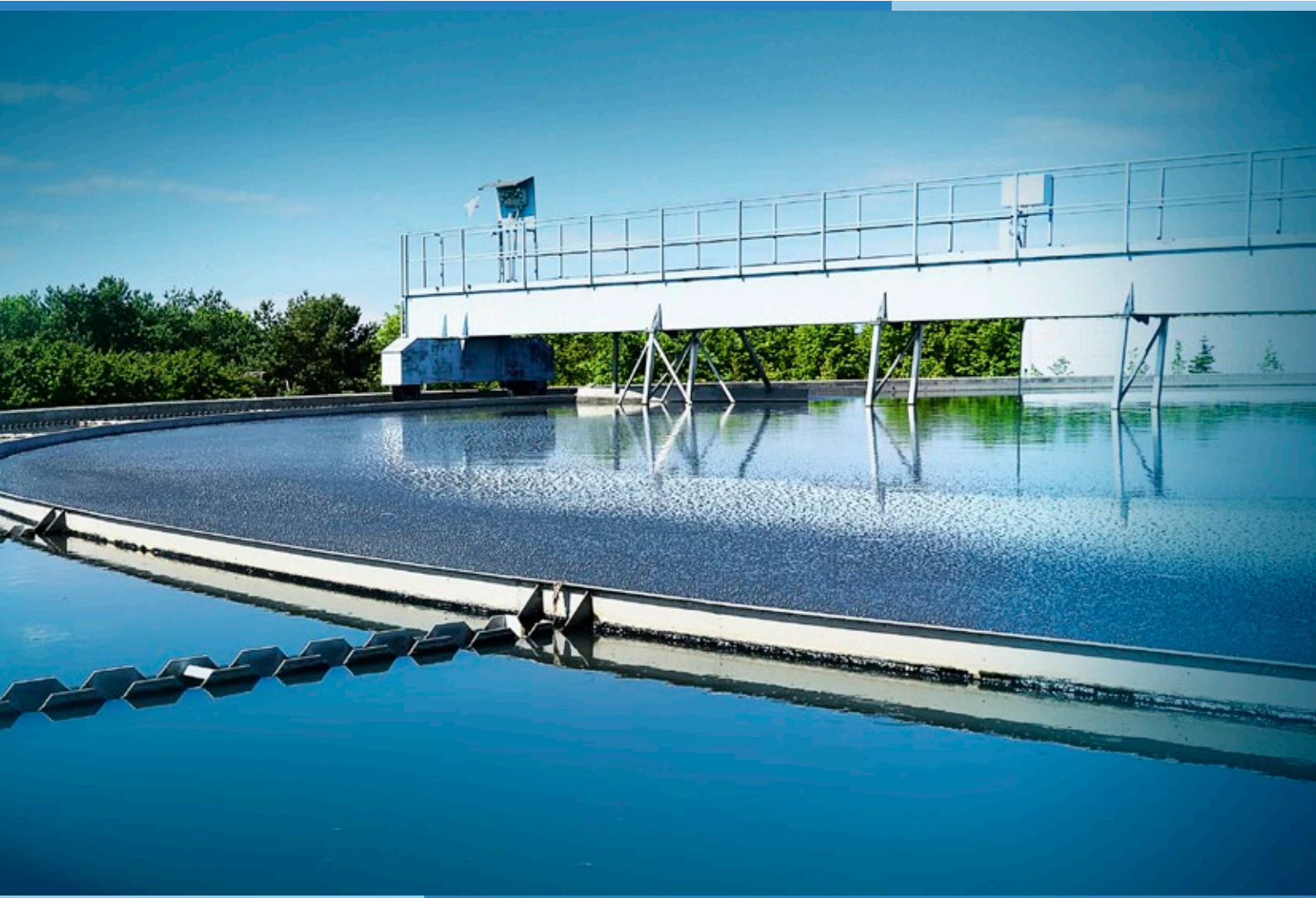
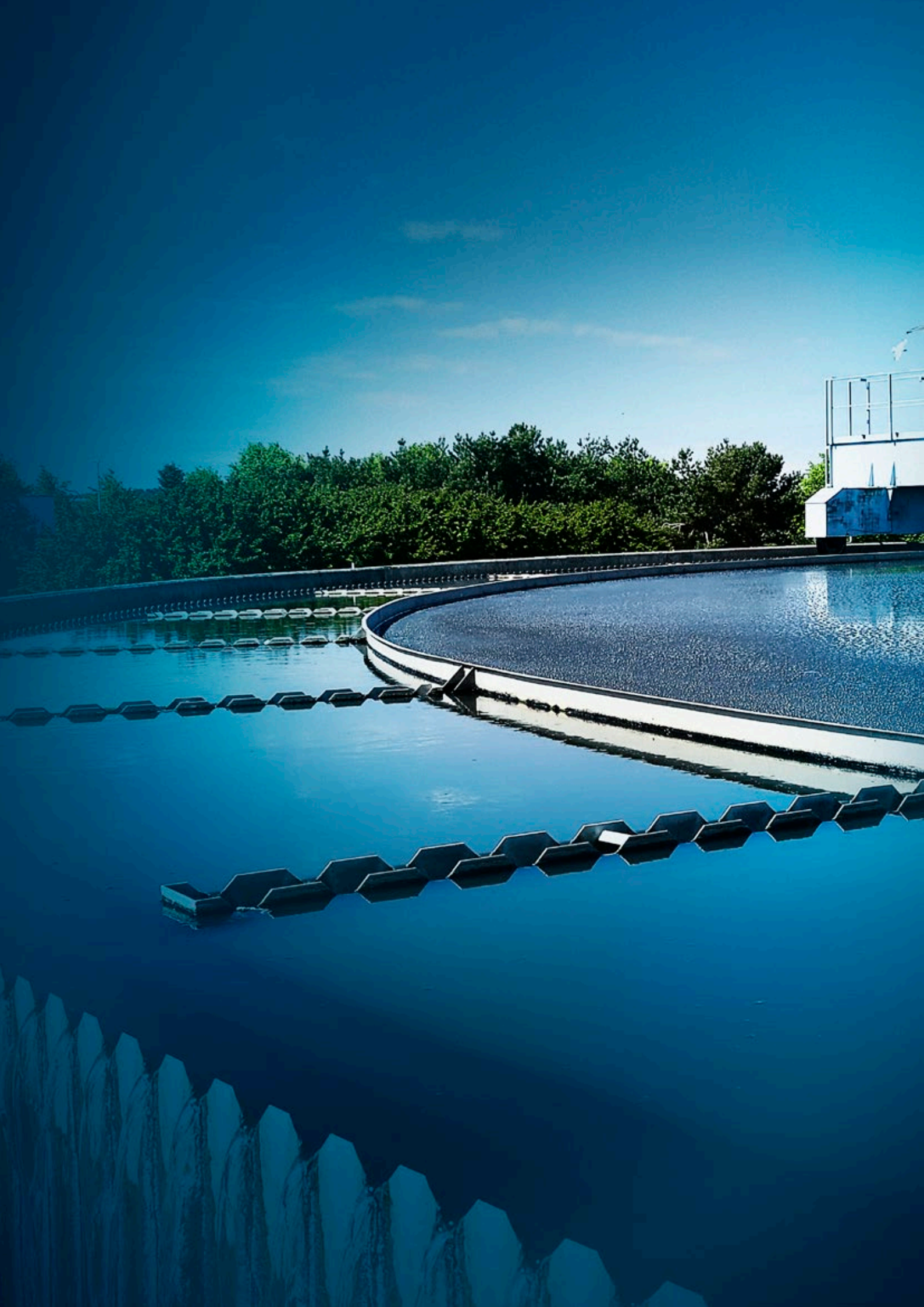


# PUMP GENIUS

Smart pumping for  
your system



Motors | Automation | Energy | Transmission & Distribution | Coatings



# PUMP GENIUS

## Summary

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WEG in Desalination Plant in Algeria	16
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# Pump Genius

## PUMP INTELLIGENCE TO YOUR SYSTEM

Pumps, pipeline and fittings can get seriously damaged if pressure or flow are out of control and such occurrences are not tracked early.

The Pump Genius is a customizable feature of WEG drives that enables your standard VSD to become dedicated for pumping systems. It ensures **accurate pressure / flow control** throughout the processing cycle, starting with raw water and its usage, ending on wastewater treatment.

With an easy-to-use programming wizard, Pump Genius helps you to **minimize downtime** and **maximize energy savings**. Everything you need is selecting one of the three options that best fits to your application.

**simplex**

**multipump**

**multiplex**



Submersible  
pumps

Wastewater  
plants

Desalination  
plants

Irrigation  
systems

Water  
distribution



## simplex

### Available for CFW11 and CFW500 Lines

The Simplex software adds ideal features to the VSD for single pump control.

#### Characteristics

- 01 main pump + 01 external pump
- Sleep mode
- Pipe filling: prevents water hammer
- Jockey pump
- Dry pump protection
- Anti-cavitation protection
- Unblocking of the pump
- Weekly schedule setting
- Customizable engineering units



## multipump

### Available for CFW11 and CFW500 Lines

Multipump is the best choice when a pumping system needs to be integrated with a cost-effective solution. It enables one single VSD to control up to 5 pumps via DOL, soft-starter or other starting methods.

#### Characteristics

- 01 inverter that controls the speed of the main pump and drives the others via direct on-line starter or soft-starter
- Two operating modes:
  - Fixed control: always the same pump with variable speed and the others always with fixed speed
  - Mobile control: possibility to switch the variable speed pump
- Sleep mode
- Sleep Boost
- Pipe filling: prevents water hammer
- Dry pump protection
- Customizable engineering units



## multiplex

### Available for CFW11 and CFW500 Lines

Multiplex software is the most complete solution to accurately control flow and pressure with high reliability.

The VSDs control, monitor and manage the entire system on their own. There is no need for additional PLC, HMI or any external devices thus installation costs can be optimized.

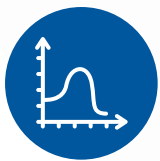
#### Characteristics

- Network inverters: up to five pumps in parallel, all driven by frequency inverter and operating at variable speed
- Two operating modes:
  - Pumps driven always in the same sequence (e.g.: pump 1, pump 2)
  - Pumps driven according to the shortest operating time
- Sleep mode
- Pipe filling: prevents water hammer
- Dry pump protection
- Anti-cavitation protection
- Customizable engineering units



# WEG TECHNOLOGY

DEDICATED TO YOUR APPLICATION.  
WATER EFFICIENCY TO OUR PLANET.



*Friendly programming*



*Enhanced control  
of pumping systems*



*Synergy with WEG  
products and solutions*

**Characteristics**

*Dedicated*

*Compatible*

*Increased efficiency*

*Reliable*



## Advantages

## Benefits

Special features to water and wastewater segment

Full protection to pumping systems and maximized usability through special functions

Save costs and space

Eliminates the complexity of existing panels that uses traditional control methods

Reduced maintenance costs

The software provides efficient and equal use of the pumps in the system

Wizards

WEG free of charge macro that can be added to your standard drive

User friendly

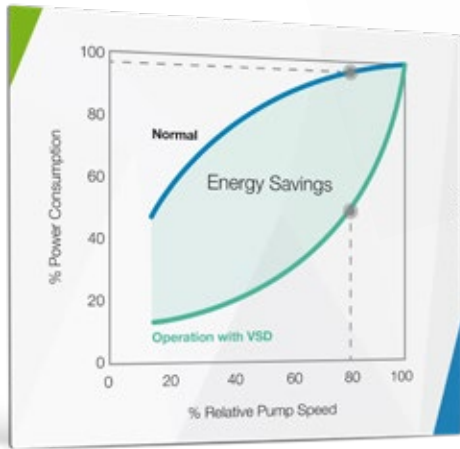
Intuitive interface tool for an easy setup, control and monitoring

Achieves better performance

By using the PID control, excellent results in terms of Energy Savings can be obtained

WEG quality

Same standard robustness and technology found in WEG products



### Energy Savings

PID controller of WEG VSDs helps the pump to achieve the best performance. Even with a minimum speed reduction of 20%, almost unnoticed in the application, the power consumption is cut almost in half.

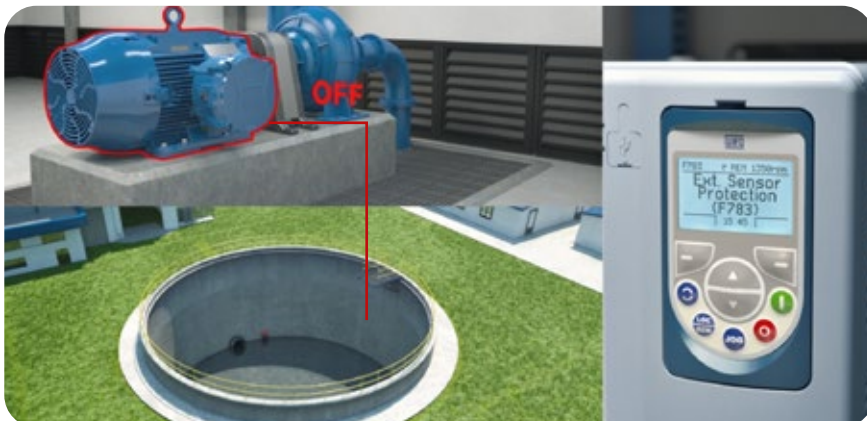
### Pipe Charging Mode

Pipe charging function allows for initial filling and lubrication as it runs for a timeframe at a preconfigured slow speed. Also, as it achieves a soft pipe filling, water hammer is avoided.



### Sleep and Wake-Up Modes / Sleep Boost

Sleep mode allows the pump to save energy and preserve the motor health when demand / flow is below the required for long periods, keeping the pump in standby mode. Along with the Sleep mode the software carries the sleep boost feature where a momentary overpressure is delivered to the pump before the system to be shut off. Wake-up mode restarts the system automatically when the pressure falls below the lower set point.



### Dry Pump Protection

A dry run persisting for long periods can cause potential damages to the pump. Pump Genius detects this operating conditions with no sensor, providing warnings and protection for the system.



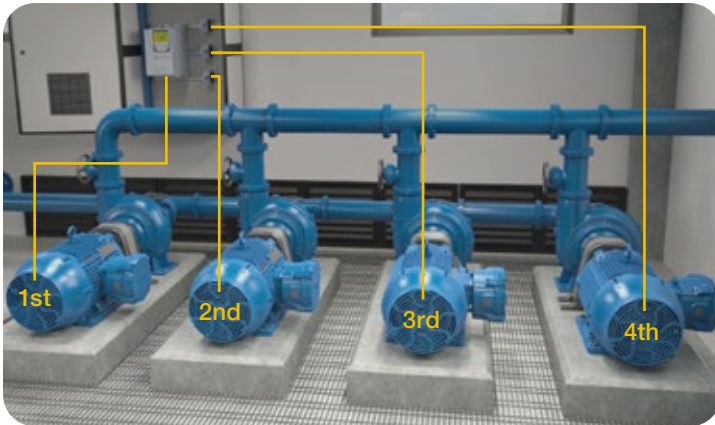


### Broken Pipe or Leakage Detection

Pump Genius diagnoses when a pump is consuming more power than it should. Through load and speed information, the drive automatically monitors and warns if a pipe leaks. Also, maximum system pressure can be configured to trigger when clogged pipe conditions take place.

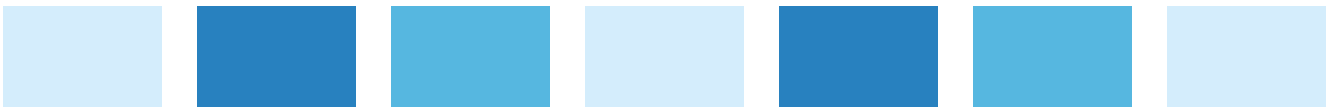
### Pump Cavitation Monitoring

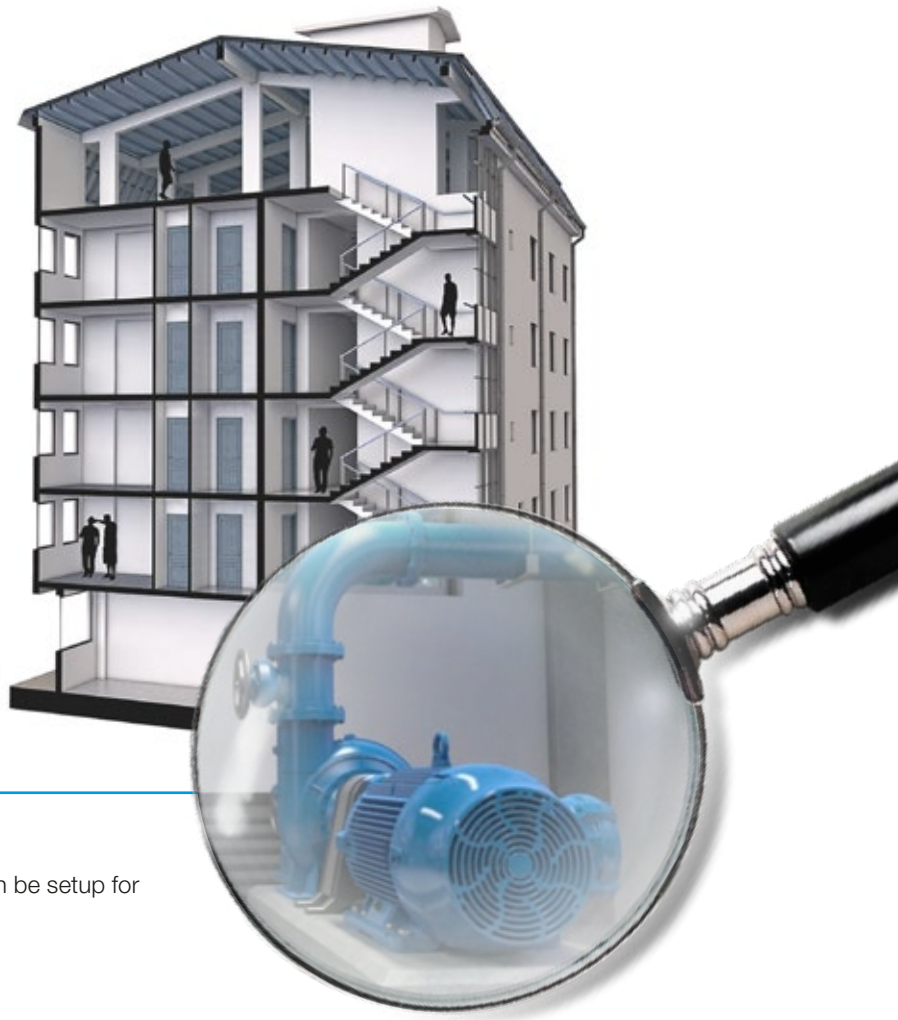
When a pump cavitation condition (e.g. low level of fluid) is detected, the drive reduces the pressure in the pipeline to avoid mechanical breaks and increases the impeller lifetime.



### Fixed or Floating Control

The user is able to select if the pumps will be started over a predetermined or rotating sequences with the intent to obtain equal wear and tear of individual pumps, as the logic monitors the runtime of the individual pumps and based on that, the specific pump is brought in or out.





### Programmable Schedules

Up to 12 programmable setpoints with time schedule can be setup for controlling the water supply.



### Jockey Pump

Under low demand, only the smaller pump is enabled. As the water consumption increases, the larger pump is activated and jockey pump is deactivated.

### Deragging

The drive is able to perform an automatic clean of the impeller every time the pump is started, whenever a clogging is detected or on user demand increasing pump lifetime.





### Master/Slave Configuration

Master/slave modes enable total management of the system. When conditions like broken sensor wire or communication wire is detected, another VSD will be automatically be nominated as master, taking the system management reestablished to keep regular conditions.

### Force Rotation

Force rotation makes the last pump in the system to be shut off when rotation is at certain low speed but it is not yet the sleep level. With old fashion logic the last pump would run indefinitely.



# Pump Genius Solution

Features		Single pump		Multiple pumps			
		SIMPLEX		MULTIPUMP		MULTIPLEX	
		CFW500	CFW11 <sup>1)</sup>	CFW500	CFW11 <sup>1)</sup>	CFW500 <sup>2)</sup>	CFW11 <sup>1)</sup>
						+ SymbiNet Plugin (RS485, CAN)	
Sleep/Wake-up modes		✓	✓	✓	✓	✓	✓
Sleep boost		✓	✓	✗	✓	✓	✓
Pipe charging		✓	✓	✓	✓	✓	✓
Dry pump protection		✓	✓	✓	✓	✓	✓
Broken pipe or leakage detection		✓	✓	✓	✓	✓	✓
Pump cavitation monitoring		✗	✓	✗	✗	✓	✓
Multiple pumps	Fixed control	NO		Up to 4 pumps	Up to 5 pumps	Up to 3 pumps	Up to 5 pumps
	Floating control			Up to 3 pumps	Up to 5 pumps		
	Possibility to force rotation			✓ (Floating Control)	✓ (Floating Control)	✓	✓
Master / Slave configuration		NO		✗	✗	✓	✓
Programmable schedules		✗	✓	✗	✗	✗	✗
Deragging		✓	✓	✗	✗	✗	✗
Jockey pump		✗	✓	✗	✗	✗	✗
Customizable engineering units		✓	✓	✓	✓	✓	✓
Selectable setpoints via digital input		✓	✓	✓	✓	✓	✓
External sensor protection		✓	✓	✗	✓	✓	✓

Notes: 1) Special firmware required.

2) In progress please contact our sales team for more information.

# Pump Genius Coding for the CFW500

As it is an application software for the CFW11 and CFW500 inverters, the coding for the Pump Genius follows the already existing format for those lines.

- 1 CFW500
 2 A
 3 02P6
 4 T
 5 4
 6 NB
 7 20
 8 C2
 9 ---
 10 SS

- 1 - CFW500 frequency inverter**  
**2 - Size of the CFW500, according to table 1 below**  
**3 - Rated output current, according to table 1 below**

CFW500 rated output current	Number of phases	Rated voltage	Frame	Internal dynamic braking (IGBT) <sup>1)</sup>	Protection rating	Internal RFI filter <sup>2)</sup>										
01P6 = 1.6 A	Single-phase	200-240 V	A	NB	IP20 ou N1	Blank or C2										
02P6 = 2.6 A							Blank or C3									
04P3 = 4.3 A						C2										
07P0 = 7.0 A							Blank (not available)									
07P3 = 7.3 A						B		DB	Blank (not available)							
10P0 = 10.0 A	A		NB	Blank (not available)												
01P6 = 1.6 A							Single-phase or three-phase			200-240 V	A	NB	Blank (not available)			
02P6 = 2.6 A														B	DB	Blank (not available)
04P3 = 4.3 A																
07P3 = 7.3 A						D		DB	Blank or C3							
10P0 = 10.0 A	E	DB	Blank or C3													
07P0 = 7.0 A				A	NB		Blank (not available)									
09P6 = 9.6 A										B	DB	Blank (not available)				
16P0 = 16 A													C	DB	Blank or C3	
24P0 = 24 A						D		DB	Blank or C3							
28P0 = 28 A	E	DB	Blank or C3													
33P0 = 33 A				A	NB		Blank or C2									
47P0 = 47 A										B	DB	Blank or C2				
56P0 = 56.0 A													C	DB	Blank or C2	
01P0 = 1.0 A						D		DB	Blank or C3							
01P6 = 1.6 A	E	DB	Blank or C3													
02P6 = 2.6 A				A	NB		Blank or C2									
04P3 = 4.3 A										B	DB	Blank or C2				
06P1 = 6.1 A													C	DB	Blank or C2	
02P6 = 2.6 A						D		DB	Blank or C3							
04P3 = 4.3 A	E	DB	Blank or C3													
06P5 = 6.5 A				A	NB		Blank or C2									
10P0 = 10.0 A										B	DB	Blank or C2				
14P0 = 14.0 A													C	DB	Blank or C2	
16P0 = 16.0 A						D		DB	Blank or C3							
24P0 = 24.0 A	E	DB	Blank or C3													
31P0 = 31.0 A				A	NB		Blank or C2									
39P0 = 39.0 A										B	DB	Blank or C2				
49P0 = 49.0 A													C	DB	Blank or C2	

#### 4 - Number of phases

S	Single-phase power supply
B	Single-phase or three-phase power supply
T	Three-phase power supply

#### 5 - Rated voltage

2	200-240 V
4	380-480 V
5	500-600 V

#### 6 - Internal Dynamic Braking (IGBT)

NB	Without internal dynamic braking IGBT
DB	With internal dynamic braking IGBT

#### 7- Degree of protection

20	IP20 protection rating
N1	NEMA1 protection rating

#### 8 - RFI filter

Blank	Without internal RFI filter
C2	With internal RFI filter - category 2
C3	With internal RFI filter - category 3

#### 9 - Special hardware versions - H xx

Blank	With IOS module included: suitable for the Pump Genius Simplex
HMP	With IOR module included: suitable for the Pump Genius Multipump

#### 10 - Special software version - Sx

Blank	Without special software
SS	With Pump Genius Simplex software
SM	With Pump Genius Multipump software

Notes: 1) Braking resistor not included.

2) Conducted emission level (IEC 61800-3).

In order to minimize such problem, WEG variable speed drives contain common-mode capacitive filters, which are enough to avoid this type of interference in most cases. If necessary, our inverters also have radio frequency (RFI) filters to reduce even more those high-frequency electromagnetic interference signals. Item 8 of the table above shows how to select the models of internal RFI filters for the CFW500. Definitions of IEC/EN 61800-3 standard.

Categories:

Category C1: variable speed drives with voltage rating below 1000 V and intended for application in the "First Environment".

Category C2: inverters with voltage rating below 1,000 V not provided with plugs or movable installations, and, when applied in the "First Environment", they must be installed and commissioned by a professional.

Category C3: inverters with voltage ratings below 1,000 V developed for application in the "Second Environment" and not designed for application in the "First - Environment".

Environments:

First Environment: environments that include domestic installations, such as establishments directly connected without intermediate transformers to the low voltage power line, which supplies buildings used for domestic purposes.

Second environment: environments that include all the buildings other than those directly connected to the low voltage power line, which supplies buildings used for domestic purposes. For RFI filters installed externally, refer to the CFW500 user manual.

For RFI filters installed externally, refer to the CFW500 user manual.

# Pump Genius Coding for the CFW11

- 1
- 2
- 3
- 4
- 5
- 6
- 7

**1 - CFW11 frequency inverter**

**2 - Rated output current for normal duty**

Power supply	Single-phase (S)	Single-phase or three-phase (B)	Three-phase (T)						
Voltage	200-240 V ac <sup>2)</sup>	200-240 V ac <sup>2)</sup>	200-240 V ac <sup>2)</sup>	380-480 V ac <sup>4)</sup>		500-600 V ac <sup>5)</sup>		660-690 V ac <sup>6)</sup>	
Current	0006 = 6 A 0007 = 7 A 0010 = 10 A	0006 = 6 A 0007 = 7 A	0007 = 7 A	0003 = 3 A	0180 = 180 A	0002 = 2.9 A	0107 = 107 A	0002 = 2.9 A	0107 = 100 A
			0010 = 10 A	0005 = 5 A	0211 = 211 A	0004 = 4.2 A	0125 = 125 A	0004 = 4.2 A	0125 = 108 A
			0013 = 13 A	0007 = 7 A	0242 = 242 A	0007 = 7 A	0150 = 150 A	0007 = 7 A	0150 = 130 A
			0016 = 16 A	0010 = 10 A	0312 = 312 A	0010 = 10 A	0170 = 170 A	0010 = 8.5 A	0170 = 147 A
			0024 = 24 A	0013 = 13 A	0370 = 370 A	0012 = 12 A	0216 = 216 A	0012 = 11 A	0216 = 195 A
			0028 = 28 A	0017 = 17 A	0477 = 477 A	0017 = 17 A	0289 = 289 A	0017 = 15 A	0289 = 259 A
			0033 = 33 A	0024 = 24 A	0515 = 515 A	0022 = 22 A	0315 = 315 A	0022 = 20 A	0315 = 259 A
			0045 = 45 A	0031 = 31 A	0601 = 601 A	0027 = 27 A	0365 = 365 A	0027 = 24 A	0365 = 312 A
			0054 = 54 A	0038 = 38 A	0720 = 720 A	0032 = 32 A	0435 = 435 A	0032 = 30 A	0435 = 365 A
			0070 = 70 A	0045 = 45 A	0760 = 760 A	0044 = 44 A	0472 = 472 A	0044 = 35 A	0472 = 427 A
			0086 = 86 A	0058 = 58 A	0795 = 795 A	0053 = 53 A	0584 = 584 A	0053 = 46 A	0584 = 478 A
			0105 = 105 A	0070 = 70 A	0877 = 877 A	0063 = 63 A	0625 = 625 A	0063 = 54 A	0625 = 518 A
			0142 = 142 A	0105 = 105 A	1,062 = 1,062 A	0080 = 80 A	0758 = 758 A	0080 = 73 A	0758 = 628 A
			0180 = 180 A	0211 = 211 A	1,141 = 1,141 A		0804 = 804 A		0804 = 703 A
0211 = 211 A									

**3 - Number of phases**

S	Single-phase
B	Single-phase or three-phase
T	Three-phase

**6 - Protection rating**

Blank	Standard (according to the table below)
21	IP21
N1	NEMA1
55	IP55

**4 - Voltage**

2	200-240 V: for frames A, B, C and D 220-230 V: for frame E
4	380-480 V
5	500-600 V
6	660-690 V

Frame	Protection rating	Special DC hardware
A	IP21	No
B	IP21	No
C	IP21	No
D	NEMA1 / IP20	No
E	IP20	No
F	IP20	No
	IP00	Yes
G	IP20	No
	IP00	Yes
H	IP20	No

**5 - Optional accessories**

S	Factory default model
0	Product with optional items



# Pump Genius Coding for the CFW11

- 8 ---
- 9 ---
- 10 ---
- 11 ---
- 12 ---
- 13 SP
- 14 Z

## 7 - HMI

Blank	With HMI included
0	Without HMI - with blank cover

## 8 - Braking

Blank	200-480 V	Frames A, B, C and D: Built-in brake IGBT. Frames E1), F and G: Brake IGBT not built-in2).
	500-600 V	Frame B Built-in brake IGBT. Frames F and G: Brake IGBT not built-in (use DBW03 - see accessories). Frame H: Brake IGBT not built-in (use DBW04 - see accessories).
	500-690 V	FFrames D and E: Built-in brake IGBT. Frames F and G: Brake IGBT not built-in.
DB	200-480 V	Frame E: Built-in brake IGBT.
	500-690 V	Frames D and E: Built-in brake IGBT. Frames F and G: Brake IGBT not built-in.
NB	500-690 V	Frames D and E: Built-in brake IGBT no need to include "DB" in the smart code.
	200-480 V	Without brake IGBT in frames D and E.

## 9 - RFI filter

Blank	200-480 V	Frames A, B, C and D: without RFI filter. Frames E, F, G and H with built-in RFI filter.
	500-600 V	Frame B: built-in RFI filter.
	500-690 V	Frames D, E, F, G and H: built-in RFI filter.
FA	200-480 V	Frames A, B, C and D: built-in RFI filter.
	500-690 V	Any frame: built-in (FA is not required in the smart code).
NF	200-480 V	Frames, A, B, C and D: standard without RFI filter (NF is not required in the smart code).
	500-600 V	Frame B: without RFI filter.
	500-690 V	Frame D: without RFI filter.

Note: 1) The CFW11 Pump Genius Simplex does not require an additional plug-in module; therefore, the I/O available on the CFW11 inverter are used. The CFW11 Pump Genius Multipump does not require an additional plug-in module to drive up to four pumps; therefore, the I/O available on the CFW11 inverter are used. If it is necessary to drive more pumps (up to 06), you must order the IOC-01 module (sold separately). The CFW11 Pump Genius Multiplex is supplied with an RS485 plug-in module for communication among the inverters present in the Symbinet network.

## 10 - Safety stop Safe Torque Off (STO)

Blank	Not built-in
Y	Includes internal STO module. 500-690 V, any frame: built-in

## 11 - Electronics 24 V dc external power supply

Blank	Factory default model
W	With electronics 24 V dc external power supply

## 12 - Special hardware

Blank	Factory default model
H	With special hardware
DC	Power supply through DC link (without rectifier bridge)
DS	Built-in switch disconnecter (IP55 models only)

## 13 - Special software<sup>1)</sup>

Blank	Without special software
SS	With Pump Genius Simplex software
SM	With Pump Genius Multipump software
SP	With Pump Genius Multiplex software

## 14 - Character that identifies the code end

Z	End of code indicator
---	-----------------------





## WEG in Desalination Plant in Algeria

Due to estimates, which shows that in the next 30 years the amount of water available per person in the north of Africa will be reduced to 80%, the Algerian government is investing on seawater desalination.

This includes the construction of three large desalination plants with production capacity of 400 cubic meters of water per day which will greatly benefit a population of over 2 million. Two units have already been concluded and the third is now being installed.

The Tlemcen-Honaine plant, located near the city of Oran, close to the border with Morocco has a production capacity of 150 thousand cubic meters and it will attend to 750 thousand inhabitants directly. It'll be one of the largest in the world.

WEG supplied Variable Speed Drives and soft-starters for the pumps that will withdraw water from the Mediterranean Sea at Honaine providing soft starting and speed variation for pumps which will result in higher efficiency.

It was invested in the three plants a total amount of US\$ 400 m. Besides the desalination plants, the resources will also be used in the construction of dams and for sanitation. According to Daho Ould Kablia, "with the new program, the Algerian government intends to find a balance between the different regions of the country and provide a fair supply and distribution of water and the services related to it".



***Benefit a population of over 2 million***



***Production capacity of 400 cubic meters***



***WEG supplied VSDs and soft-starters***





## Sustainability

Sustainability has been an integrated part of WEG's philosophy since its foundation. That is why awareness with environment protection has been a **major concern** in the company for the **correct use of natural resources**.

Half of the energy produced around the world is used to operate pumps, while one third of the world's population live in areas experiencing water shortages. As known by nations, the effective use of electric power reduces significantly environmental impacts and helps to guarantee the sustainable use of natural resources for the future generations.

**Guarantee the lowest environmental impact of our products and manufacturing processes by:**



**Being in compliance with the applicable environmental legislation**



**Improving continuously by establishing environmental goals and targets**



**Acting preventively with the aim of protecting the environment**



**Ecoefficient processes and products, saving natural resources**

### Certifications

ISO 50001:2011  
ISO 14001:2014  
ISO 9001:2008





# Global presence is essential, as much as understanding your needs.

## Global Presence

With more than 30,000 employees worldwide, WEG is one of the largest electric motors, electronic equipments and systems manufacturers. We are constantly expanding our portfolio of products and services with expertise and market knowledge. We create integrated and customized solutions ranging from innovative products to complete after-sales service.

WEG's know-how guarantees our **Pump Genius** is the right choice for your application and business, assuring safety, efficiency and reliability.



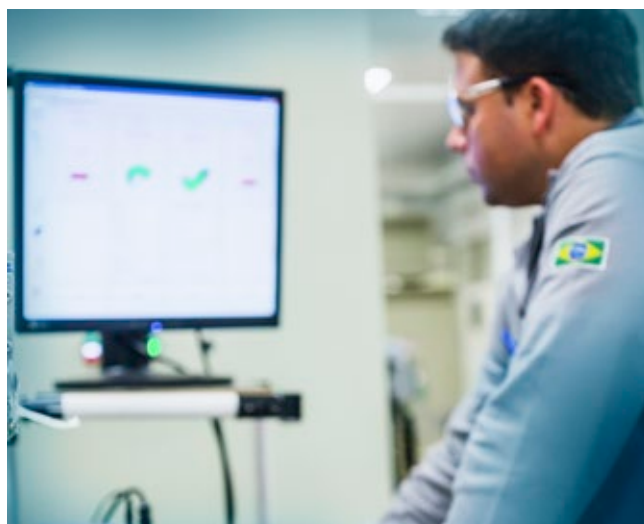
**Availability** is to have a global support network



**Partnership** is to create solutions that suit your needs



**Competitive edge** is to unite technology and innovation



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Cod: 50059602 | Rev: 05 | Date (m/a): 06/2021.

The values shown are subject to change without prior notice.  
The information contained is reference values.