Motors

Water and Wastewater Industry
Compliant with WIMES 3.03
Issue 7, June 2020

Motors | Automation | Energy | Transmission & Distribution | Coatings

WIMES Compliant Motors from WEG
Efficiency and reliability for the Water and Wastwater Industry

WEG products stand out for the flexibility of their electrical and mechanical design, and adaptability to meet the strictest customer requirements in different applications. Demonstrated through its comprehensive range of products for use in the Water and Wastewater Industry, WEG is committed to providing superior quality and excellence for water and wastewater applications worldwide.

Updated in June 2020, the Water Industry Mechanical & Electrical Specification (WIMES) 3.03 issue 7, has been created with the technical support and cooperation of the WIMES Electrical Working Group, and outlines the key requirements low voltage electric motors intended for use in the UK Water Industry.

These requirements ensure the robustness and efficiency of the UK Water infrastructure and contribute to reducing energy consumption and ownership costs.

WIMES compliant motors from WEG include, as standard, many of the mandatory and optional features detailed in the specification, with particular focus on energy efficiency, reliability, flexibility, safety and lower total cost of ownership.

As a member of the Pump Centre Council WEG actively participates in the review and validation of the WIMES specification, thus ensuring our products are in full compliance with its requirements.

Key Benefits of WIMES motors from WEG

Durability

WEG's W22 and W50 WIMES motors combine optimum performance with a comprehensive build specification, all backed by a **5 year warranty.**

- Corrosion Protection: WIMES specifies a mandatory minimum paint finish of C3 Medium durability in accordance with the requirements of BS EN ISO 12944, therefore ensuring maximum robustness and increased service life.

Low Cost of Ownership

Designed to operate throughout their life with minimum possible energy consumption, providing optimum levels of productivity under continuous operation and high performance with minimum unplanned downtime - WIMES compliant motors from WEG generate maximum value to the user.

- Condition Monitoring: WIMES requires factory fitted PTC thermistors to be fitted to all motors intended for use with VSD's and from 30kW for fixed speed duties, with the addition of PT100 RTD's for all motors rated at 200kW and above. WEG WIMES motors have PTC on all frame sizes. Vibration monitoring provision is also provided for motors in frame sizes 160 and up.

Energy Saving

Energy costs represent approximately 90% of the total operational costs throughout a motor's lifetime, with acquisition, installation and maintenance accounting for the remainder. The W22 and W50 industrial motor platforms from WEG offer efficiencies complying with the IE3 and IE4 minimum values specified in IEC 60034-30-1:2014 (Efficiency classes of single speed, three phase, cage induction motors IE-code), thus generating energy savings and offering reduced payback on investment.

- WIMES 3.03 references the minimum efficiency levels for 2, 4, 6 and 8 pole motors having rated outputs of 0.12kW to 1000kW and dictates that all fixed speed safe area motors must meet at least the IE3 level (in accordance with Regulation [EU] 2019/1781)
- Hazardous area and variable speed driven motors with rated outputs between 0.75kW and 1,000kW, must also meet the minimum efficiency level IE3.

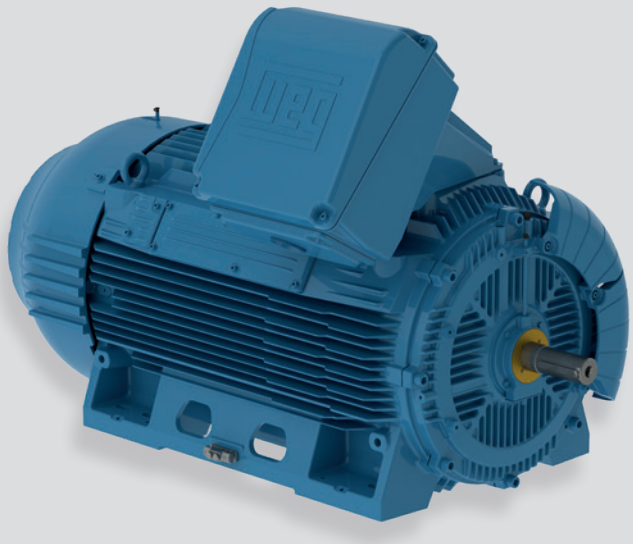
The WEG WIMES Compliant Range

W22 WIMES

- Efficiency levels: Premium Efficiency (IE3) and Super Premium Efficiency (IE4)
- Robust Stator frame, endshield and terminal boxes made from high grade (EN GJL 200) cast iron
- Frame sizes: 63 up to 355A/B
- Cooling method: TEFC (Totally Enclosed Fan Cooled) - IC411
- Rated output: 0.12 to 500 kW
- Number of poles: 2, 4, 6 and 8
- Painting plan: C3M - according to ISO 12944
- Suitable for VFD operation

W50 WIMES

- Efficiency levels: Premium Efficiency (IE3) and Super Premium Efficiency (IE4)
- Robust Stator frame, endshield and terminal boxes made from high grade (EN GJL 200) cast iron
- Frame sizes: 355J/H to 450J/H
- Cooling method: TEFC (Totally Enclosed Fan Cooled) - IC411
- Rated output: 315 to 1000 kW
- Number of poles: 2, 4, 6 and 8
- Painting plan: C4M - according to ISO 12944
- Suitable for VFD operation

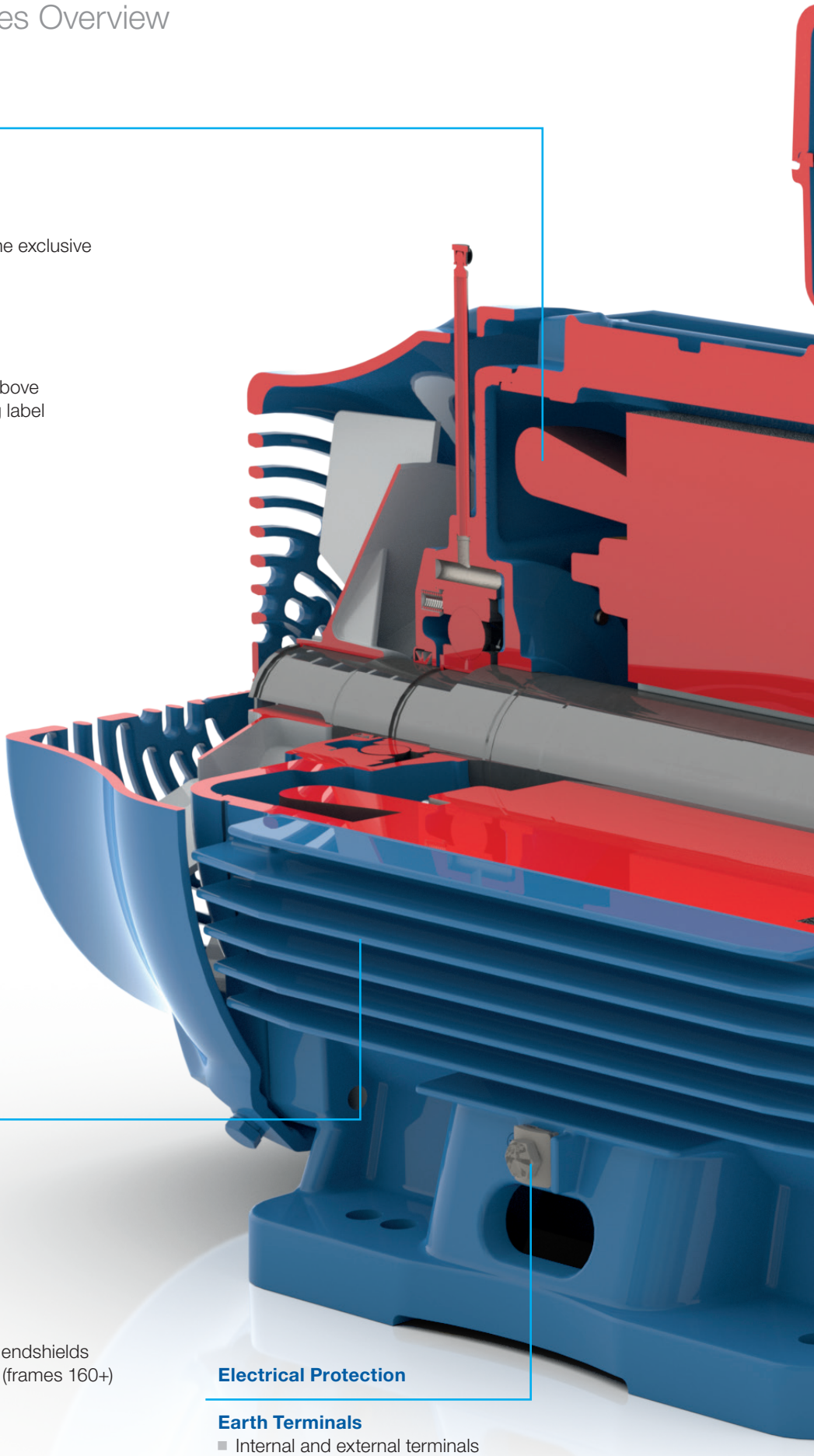


WIMES Standard Features Overview

Energy Efficiency

Windings Design
- Premium Efficiency (IE3)
- Super Premium (IE4) optional
- Class F Insulation (80K rise)
- Suitable for inverter operation through the exclusive WEG WISE® insulation system

Windings Protection
- Thermal Protection:
  - PTC Thermistors
  - RTD's (PT100) - ratings 200 kW and above
- Anti-condensation heaters (with warning label according to WIMES)



Durability

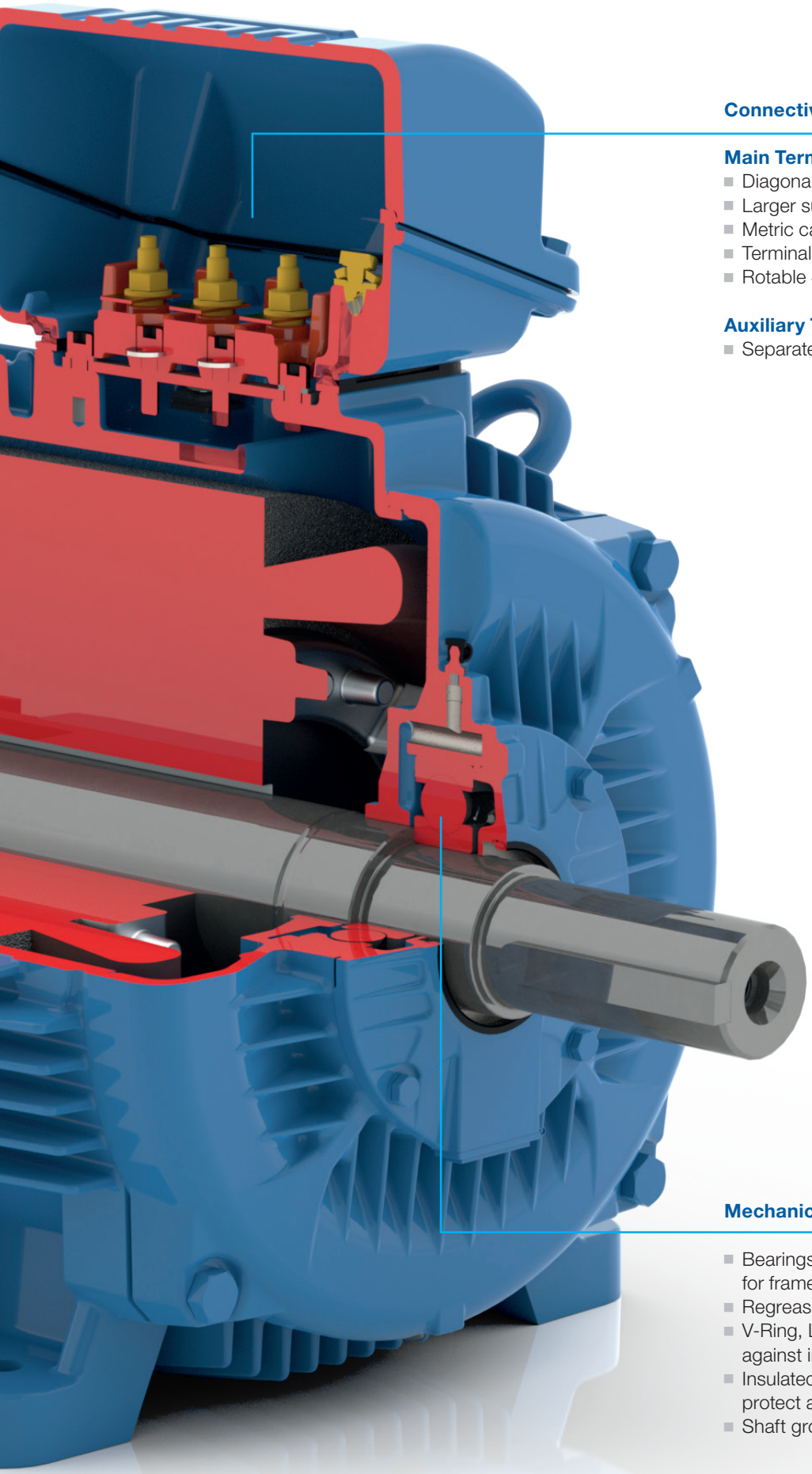
Corrosion Protection
- Painting plans according ISO 12944
- W22: C3 Medium durability
- W50: C4 Medium durability

Ingress Protection
- Degree of protetcion: IP55

Condition Monitoring
- Flats for vibration sensors on frame and endshields
- M8 tapped holes for bearing monitoring (frames 160+)

Electrical Protection

Earth Terminals
- Internal and external terminals



Connectivity

Main Terminal Box

- Diagonally split for easier cable handling
- Larger surface area on terminal box face for glands
- Metric cable entries
- Terminal box on LHS or RHS optional
- Rotable 4 x 90º

Auxiliary Terminal Box

- Separate connection box for space heaters (W50)

Mechanical Reliability

- Bearings: Metal shielded (ZZ) sealed for life bearings for frames 63 to 132
- Regreasing nipples for frames 160M and above
- V-Ring, Lip or Taconite Labyrinth seals to protect against ingress of water and solids
- Insulated NDE bearing hubs for frames 280+ (to protect against circulating shaft currents)
- Shaft grounding for frames 315 and above

W22 WIMES Standard Construction Features

Frame			63	71	80	90	100	112	132	160	180
Mechanical features											
Mounting form			B3T								
Frame	Material		Cast iron EN GJL200								
Degree of protection			IP55								
Grounding			Earth terminals located inside the terminal box and externally on the motor frame								
Cooling method			Totally enclosed fan cooled - IC411								
Fan	Material	2P	Polypropylene								
		4P +									
Fan cover	Material		Steel							Cast iron EN GJL200	
Endshields	Material		Cast iron EN GJL 200								
Drain			Rubber drain plug								
Bearings	Drive end	2P	6201 ZZ	6202 ZZ	6204 ZZ	6205 ZZ	6206 ZZ	6207 ZZ	6308 ZZ	6309	6311
		4P +									
	Non drive end	2P			6203 ZZ	6204 ZZ	6205 ZZ	6206 ZZ	6207 ZZ	6209	6211
		4P +									
	Locking		63-132 Without bearing cap - spring washer at NDE 160-180 Locked on DE with internal bearing cap - spring washer at NDE								
	Shaft seal		'V' ring								
	Insulated NDE endshield		Without								
	Shaft grounding brush at DE		Without								
Lubrication	Type of grease		Mobil Polyrex EM								
	Grease fitting		Without							With	
Terminal box	Material		Cast iron EN GJL200								
Cable Entries	Main	Size	2 x M20 x 1.5			2 x M25 x 1.5		2 x M32 x 1.5		2 x M40 x 1.5	
	Accessory	Size	2 x M20 x 1.5								
	Plug		Threaded plastic plug for transport and storage								
Shaft	Material		AISI 1040/45								
	D.E. Threaded hole	2P	M4	M5	M6	M8	M10	M10	M12	M16	M16
		4P +									
Vibration level			Grade A								
Balancing			With half key								
Provision for vibration sensors			Without (63 -132) M8 tapped hole for each bearing housing (160+)								
Nameplate	Material		Stainless steel AISI 304								
Painting	Plan		202P - Polyurethane								
	Performance Criteria		Corrosive category C3 Medium. Durability Medium according to ISO 12944								
	Colour		IE3: RAL 5009 - Blue IE4: RAL 6002 - Green								
Electrical features											
Design			N								
Voltage	IE3		220-240/380-415//440-460 V					380-415/660//440-460 V			
	IE4		230/400//460V					400/690//460V			
Winding	Impregnation		Dip and bake								
	Insulation class		F (DT 80K)								
Service factor			1.00								
Space heaters (with WIMES warning label)			110 V (63 - 132) 110/230 V (160 - 180)								
Rotor			Aluminium die cast								
Thermal protection			Thermistor PTC, 1 per phase, for tripping								

Frame			200	225S/M	250S/M	280S/M	315S/M	315L	355M/L	355A/B
Mechanical features										
Mounting form			B3T							
Frame	Material		Cast iron EN GJL 200							
Degree of protection			IP55							
Grounding			Earth terminals located inside the terminal box and externally on the motor frame							
Cooling method			Totally enclosed fan cooled - IC411							
Fan	Material	2P	Polypropylene							Aluminium
		4-8P	Polypropylene					Aluminium		
Fan cover	Material		Cast iron EN GJL200							
Endshields	Material		Cast iron EN GJL200							
Drain			Rubber drain plug							
Bearings	Drive end side	2P	6312	6314	6314	6314	6314	6314	6316	6316
		4P+				6316	6319	6319	6322	6322
	Non drive end side	2P	6212			6314	6314	6314	6314	6314
		4P+				6316	6316	6316	6319	6319
	Locking		200 Locked on DE with internal bearing cap - spring washer at NDE 225S/M+ Locked on DE with internal and external bearing cap - preload springs at NDE							
	Shaft Seal		200 - 'V' Ring 225+ - WSeal®							
	Insulated NDE endshield		Without (200 - 280) With (315+)							
	Shaft grounding brush at DE		Without (200 - 280) With (315+)							
Lubrication	Type of grease		Mobil Polyrex EM							
	Grease fitting		With grease fitting							
Terminal box	Material		Cast iron EN GJL200							
Cable Entries	Main	Size	2x M50 x 1.5		2 x M63 x 1.5			2 x M63 x 1.5 (removable gland plate)		
	Accessory	Size	2 x M20 x 1.5							
	Plug		Threaded plastic plug for transportation and storage							
Shaft	Material		AISI 1040/45					AISI 4140		
	D.E. Threaded hole	2P	M20		M20	M20	M20	M20	M20	M20
		4P+							M24	M24
Vibration level			Grade A							
Balancing			With half key							
Provision for vibration sensors			M8 tapped hole for each bearing housing							
Nameplate	Material		Stainless steel AISI 304							
Painting	Plan		202P - Polyurethane							
	Performance Criteria		Corrosive category C3 Medium. Durability Medium according to BS EN ISO 12944							
	Colour		IE3: RAL 5009 - Blue IE4: RAL 6002 - Green							
Electrical features										
Design			N							
Voltage	IE3		380-415/660//440-460 V							
	IE4		400/690//460 V							
Winding	Impregnation		Dip and bake	Continuous flow impregnation						
	Insulation class		F (DT 80K)							
Service factor			1.00							
Space heaters (with WIMES warning label)			110/230V							
Rotor			Aluminium die cast							
Thermal protection			Thermistor PTC, 1 per phase, for tripping. Motors rated at 200kW and above also fitted with RTD's (PT100 - 2 wire)							

W50 WIMES Standard Construction Features

Frame			355 J/H	400 L/K	400 J/H	450 L/K	450 J/H
Mechanical features							
Mounting			B3L				
Frame	Material		Cast iron EN GJL200				
Degree of protection			IP55				
Grounding			Double grounding (1 terminal box + 1 frame)				
Cooling method			Totally enclosed fan cooled - IC 411				
Fan	Material	2P	Cast iron EN GJL200				
		4P+					
Fan cover	Material		Cast iron EN GJL200				
Endshields			Cast Iron EN GJL200				
Drain			Automatic drain plug				
Bearings	Drive end	2P	6314	6218	6218	6220	6220
		4P+	6322	6324	6324	6328	6328
	Non-drive end	2P	6314	6218	6218	6220	6220
		4P+	6319	6319	6319	6322	6322
	Locking		DE Bearing locked with bearing cap				
	Shaft Seal		Taconite Labyrinth				
	Insulated NDE endshield		With				
	Shaft grounding brush at DE		With (for motors driven with VFD)				
Lubrication	Type of grease		Mobil Polyrex EM				
	Grease fitting		With grease fitting				
Terminal box	Material		Cast Iron EN GJL200				
Cable Entries	Main	Size	2 x M63 x 1.5 (removable gland plate)				
	Accessory		3 x M20 x 1.5				
	Plug		Threaded plastic plug for transportation and storage				
Shaft	Material		AISI 4140				
	D.E. Threaded hole	2P	M20				
		4P+	M24				
Vibration level			Grade A				
Balancing			With half key				
Provision for vibration sensors			M8 tapped hole for each bearing housing				
Nameplate	Material		Stainless Steel AISI 304				
Painting	Plan		214P - Polyurethane				
	Performance Criteria		Corrosive category C4 High. Durability Medium according to ISO 12944				
	Colour		RAL 5009				
Electrical features							
Design			N				
Voltage			380V to 690V				
Winding	Impregnation		Continuous flow impregnation				
	Insulation class		F (DT 80 K)				
Space heaters (with WIMES warning label)			110-127/200-240 V				
Service factor			1.00				
Rotor			Die cast Aluminium				Copper bars
Thermal protection			Thermistor PTC, 1 per phase, for tripping at 155°C and PT100 - 3 wire (2 per phase)				

Efficient Solutions with WEG Variable Frequency Drives

The CFW-11 System Drive represents the latest generation of Variable Speed Drive, designed for the control of squirrel cage induction and permanent magnet motors.

Product Highlights

- Power Range:
  - 1.5kW to 650kW @ 400V (IP20)
  - 1.5kW to 132kW @ 400V (IP54)
- Control mode: scalar (V/Hz), open loop vector sensorless and closed loop with encoder.
- Overload capacity:
  - Normal Duty (ND) = 110% for 60 sec every 10min
  - Heavy Duty (HD) = 150% for 60 sec every 10min
- Built-in PID controller
- Local graphic keypad with backlight and real-time clock supplied as standard
- Cat. C3 RFI filter
- Soft PLC
- Plug 'n' Play Accesories

Innovative and simple

The CFW11 variable frequency drive from WEG incorporates several innovative features which are both helpful and beneficial to customers, mainly due to the simplicity of its installation and operation. The CFW11 was developed utilising a Plug-and-Play philosophy (connect and use) allowing simple and fast installation of the VSD and its accessories. The keypad has a navigation and programming system similar to mobile phones, with soft-key buttons. It is possible to access the parameters sequentially or through groups of parameters. The keypad also makes the oriented Start-up function available, guiding the user through the necessary programming.

Flexibility

The CFW11 adapts to the customer's needs via a broad range of accessories which are easily installed. Besides this, the drive incorporates a 'Soft PLC' function, which offers PLC functionality and enables Customers to create their own user applications using the WLP software (programming in LADDER).

Inverter duty applications

WEG's exclusive WISE® (WEG Insulation System Evolution) utilised across the W22 and W50 WIMES motor range, increases the dielectric resistance of the motor windings, permitting operation with variable frequency drives at voltages up to 690V, and consequently resulting in flexibility and extended motor lifetime.
The stator winding is suitable for variable speed drive application, taking into account the limits shown in the table below.

Motor rated voltage	Voltage Spikes 1)	*dV/dt* 2)	Rise time 2)	Time between pulses
	At motor terminals (phase-phase)	At motor terminals (phase-phase)		
V_{rated} < 460 V	≤ 1600 V	≤ 5200 V/µs	≥ 0,1 µs	≥ 6 µs
460 V ≤ V_{rated} < 575 V	≤ 2000 V	≤ 6500 V/µs		
575 V ≤ V_{rated} ≤ 1000 V	≤ 2400 V	≤ 7800 V/µs		

1) Peak voltage in the case of unipolar pulses. Peak-to-peak voltage in the case of bipolar pulses.
2) dV/dt and Rise time definition according to Nema Std. MG1 - Part 30.

Efficient Solutions with a WEG Drive and Motor Package

Pump Genius

Using WEG's Soft PLC software with pumps in parallel increases the flexibility of the pumping system in operation and implementation, whilst also increasing the lifespan of the system. It regulates the flow according to the pumping systems exact demand, and with easy to understand fault diagnostics ensures a continuous, uninterrupted service, thus enabling engineers to maximise system efficiency and performance. The Pump Genius software allows for the user to configure the system into either single controller (figure 1) or mult-drive controller (figure 2).

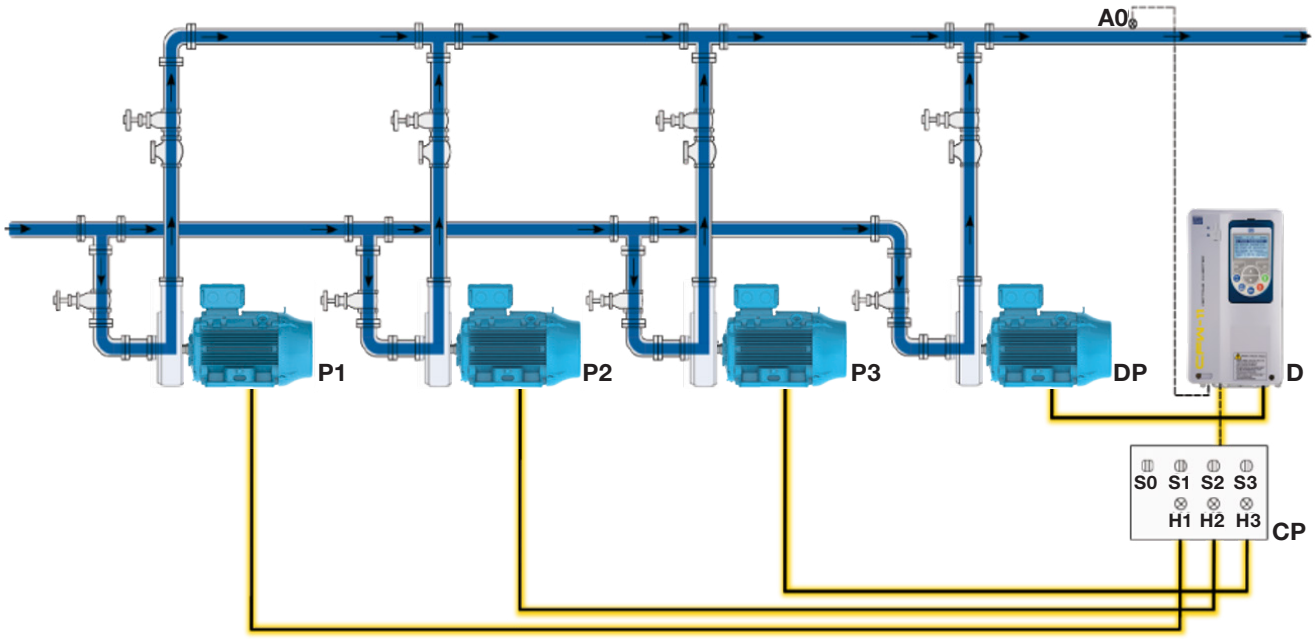


Figure 1 - Single Drive Configuration.

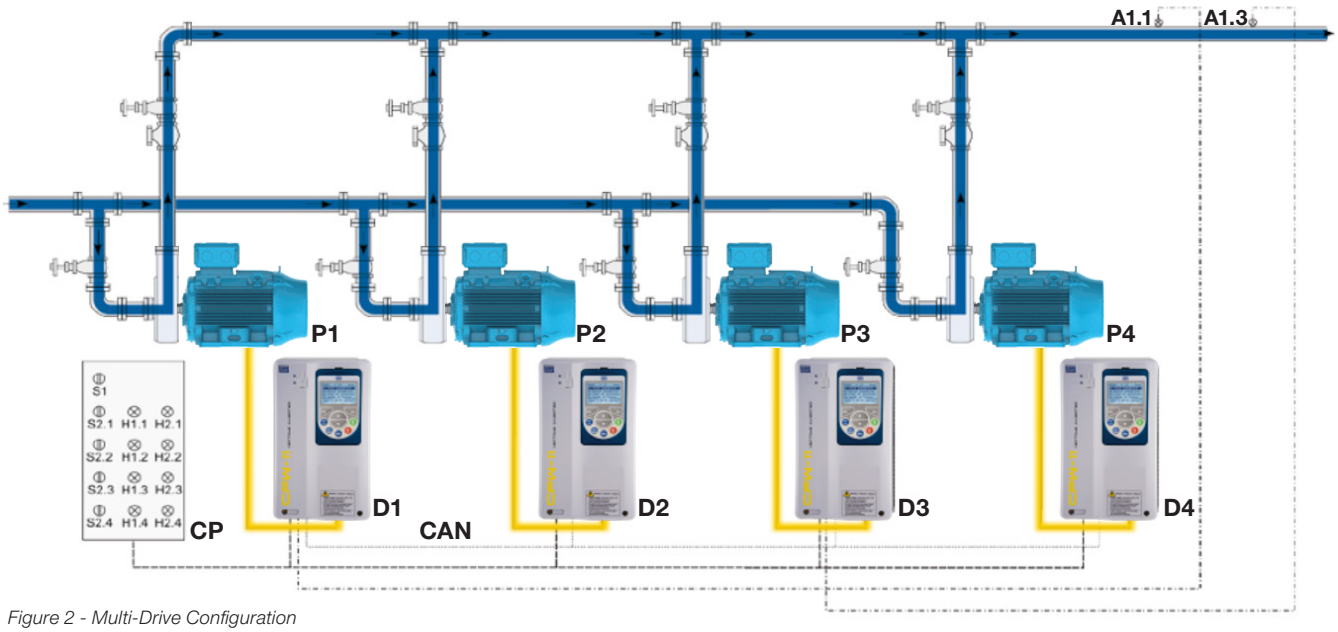


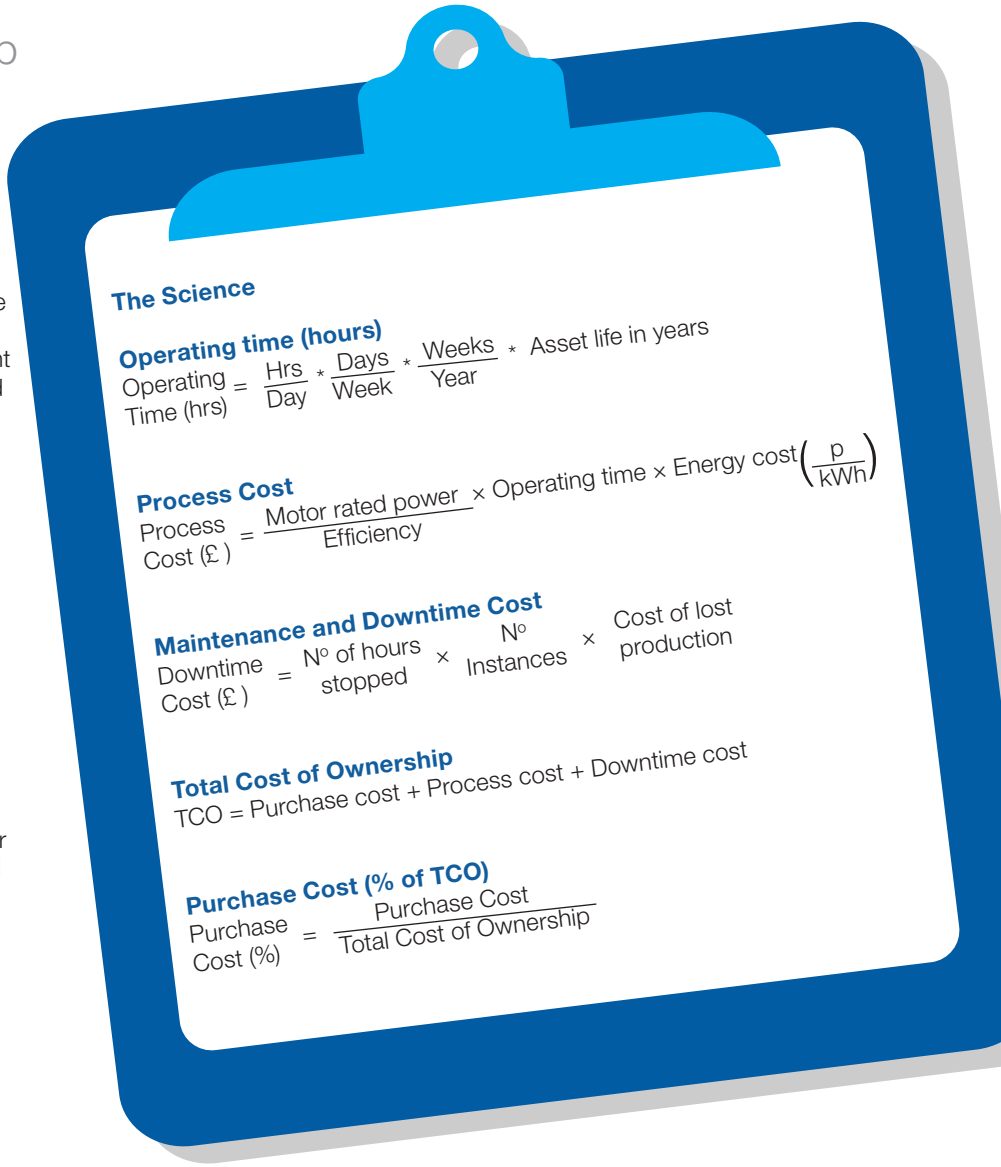
Figure 2 - Multi-Drive Configuration

Total Cost of Ownership

In today's economic climate, procurement professionals are coming under increased pressure to reduce their company's expenditure, however this approach can often prove counterproductive as focusing simply on the purchase cost does not account for the majority of the costs associated with the asset.

Whilst the purchase cost is often a first factor considered when buying new equipment, it is often insignificant when compared to the cost of running the equipment, **typically represents less than 2% of the total cost of ownership.**

By adopting a **Total Cost of Ownership** approach the cost of purchasing, operating or process cost and the planned maintenance and unplanned downtime costs of your electrical equipment are all considered within the procurement calculation.



Whilst WIMES 3.03 issue 7 mandates the use of Premium Efficiency (IE3) motors, the energy saving potential of Super Premium (IE4) motors far outweighs this additional investment in purchase price. The reduction in CO^2 emissions is one of the direct consequences, and therefore benefits, of increasing efficiency in industry. Using IE4 rated motors today will show that a company is serious about saving energy, reducing their carbon footprint and saving money.

The Super Premium Efficiency lines from WEG, for both safe and haardous areas are the most complete range of IE4 induction motors available on the market today, designed to offer not only a significant reduction in energy consumption, but improved noise and vibration levels, higher reliability, easier maintenenace and lower overall total cost of ownership.

Go to our website at www.weg.net/institutional/GB/en/solutions/energy-efficiency/see-simulator to check the potential reduction in CO^2 emissions and the return on investment of Super Premium

For WEG's worldwide
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