

# **Frequency Inverter**

# CFW11 Ve45.90

# Addendum to the Programming Manual CFW11 V5.8X





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# **CFW11**

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# ABOUT THE ADDENDUM

This addendum contains the modifications implemented to the special version Ve45.90 related to the standard version V5.8X, which must be used together with the CFW11 V5.8X Programming Manual.

### **1 FIRE MODE**



#### DANGER !

- Notice that the CFW11 is just one of the components of the HVAC system, and it is configurable for different functions, including the "Fire Mode" function.
- Thus, the full operation of the "Fire Mode" function depends on the accuracy of the project and on the joint performance of the components of the system.
- Ventilation systems that work on life safety applications must be approved by the Fire Department and/or another competent public authority.
- The non-interruption of the CFW11 operation, when configured for operation in the "Fire Mode" function, is critical and must be considered in the preparation of safety plans in the environments in which they are installed, since damages may occur to the CFW11 itself and to other components of the HVAC system, to the environment in which it is installed and to people with risk of death.
- The operation in the "Fire Mode" function may, under certain circumstances, result in fire, since the protection devices will be disabled.
- Only personnel from engineering and safety areas must consider the configuration of the equipment for the "Fire Mode" function.
- WEG strongly recommends to follow the cares and procedures above before using the CFW11 in the "Fire Mode" function, and WEG will not be liable to the final user or third parties for any losses or damages direct or indirectly incurred due to the programming and operation of the CFW11 in the "Fire Mode" regime, considering the critical and special use of this function.

#### NOTE !

When the user activates the "Fire Mode" function, he/she acknowledges that the protection functions of the CFW11 are disabled, which may result in damages to the CFW11 itself, to the components connected to it, to the environment in which it is installed and to people present in such environment; therefore, the user takes full responsibility for the risks arising from such operating condition. Operation with the "Fire Mode" function programmed voids the warranty of the product. The operation in this condition must be validated by a duly qualified professional from engineering and occupational safety areas, since such procedure significantly increases the operating risk.

The "Fire Mode" function is intended to make the frequency inverter continue to drive the motor even under adverse conditions, inhibiting most faults generated by the frequency inverter in order to protect itself or protect the motor. The "Fire Mode" is selected by activating a digital input previously set to "Fire Mode" with logic level "0" (0 V) at the input terminals. When the drive enters the "Fire Mode", the indication "Fire" will be shown in the upper left corner of the display on the HMI (keypad), and the status of the operation mode will be updated in parameter P0006. It is also possible to monitor this condition by a digital output set to "Fire Mode". During operation in the "Fire Mode" all STOP commands are ignored (even General Enable), except for the Safety Stop Relays (inputs).

A couple of Faults (considered critical) that can damage the drive will not be disabled; they will have special treatment instead. When a critical fault occurs, it will not be displayed on the HMI; the drive will only disable the PWM pulses, wait for one second and perform an autoreset. If any critical failure occurs consecutively for 10 times within a 1-minute interval, with interval counting from the first failure, the 11th failure will be shown on the HMI and automatic restart will not occur

The safety stop relay fault (F0160) does not follow this pattern. In this case, whenever the fault occurs, it will be shown on the HMI, and the autoreset time is set in parameter P0340, limited to one second even with P0340 set to 0. The amount of autoreset in this case is unlimited.

All other drive faults will be ignored when the fire mode function is enabled.

To summarize this special behavior of fault reset, Table 1.1 on page 5 presents a list of all inverter faults and alarms with their respective behavior when the fire mode function is activated.

Fault/Alarm	Description	Enabled	Disabled	Comments
F006	Line Unbal./Phase Loss		Х	
A010	Rectifier Temper. High	Х		
F011	Rectifier Overtemper.		X	
F020	24Vcc Supply Fault		Х	
F021	DC Link Undervoltage		Х	
F022		X		PWM disabled for 1s and limited auto reset
F030	LI Arm Fault	X		PWM disabled for 1s and limited auto reset
F034	V Arm Fault	X		PWM disabled for 1s and limited auto reset
E038	W/ Arm Fault	X		PWM disabled for 1s and limited auto reset
E042		×		PWM disabled for 1s and limited auto reset.
1042	High Load on Motor	× ×		
A040				
A047			v	
F040		X		
A050	Currenter and ICDT (U)	X	N N	
F051	Overtemper. on IGB1s (U)	X	X	
A053	Temper. High on IGB Is (V)	X		
F054	Overtemper. on IGBIs (V)		X	
A056	Temper. High on IGBTs (W)	X		
F057	Overtemper. on IGBTs (W)		X	
F062	Fault Unbal.		X	
F065	Encoder Fault (SW)		X	
F066	Encoder Fault (SW)		Х	
F067	Encoder/Mot. Miswired		Х	
F070	Overcurrent/Short-circ.	Х		PWM disabled for 1s and limited auto reset.
F071	Output Overcurrent	X		PWM disabled for 1s and limited auto reset.
F072	Motor Overload		Х	
F074	Output Ground Fault	X		PWM disabled for 1s and limited auto reset.
F076	Unbal. Motor Current		Х	
F077	DB Resistor Overload		Х	
F078	Motor Overtemper.		Х	
F079	Encoder Fault		X	
F080	CPU Error (Watchdog)		Х	
F082	Copy Function Fault		Х	
F084	Self-diagn. Fault		Х	
A088	Com Lost	Х		
A090	External Alarm	Х		
F091	External Fault		X	
F099	Invalid Cur Offset		X	
A110	Motor w/High Temperature	X		
Δ128	Serial Comm. Timeout	X		
A120	Anybus Offline	X		
A120	Anybus Access Error	×		
A122	CAN Rue Dewer Feilure			
A133				
A134	CANopon Comm. Error			
A135	CANopen Comm. Error	×		
A130		X		
A137		X		
A138	Clear Mode Profibus	X		
A139		X		
A140	Access Error Prot.Interf.	X		
F150	Motor Overspeed		Х	
F151	Flash Memory Module Fault		Х	
A152	Internal Air Temper. High	Х		
F153	Internal Air Overtemper.		Х	
A155	Under-temperature	Х		
F156	Under-temperature		Х	
F160	Safety Stop Relay	X		Auto reset follows P0340 and unlimited.
F161	Timeout PLC11 CFW11		Х	
A162	Incompatible PLC Firmware	X		

Table 1.1: Fault and alarm behavior when fire-mode function is activated

#### FIRE MODE

Fault/Alarm	Description	Enabled	Disabled	Comments
A163	Break Detect AI1	Х		
A164	Break Detect AI2	Х		
A165	Break Detect AI3	Х		
A166	Break Detect Al4	Х		
F174	Fan Speed Fault - Left		Х	
F175	Fan Speed Fault - Center		Х	
F176	Fan Speed Fault - Right		Х	
A177	Fan Replacement	Х		
A178	Fan Speed Alarm	Х		
F179	Fan Speed Fault		Х	
A181	Invalid clock value	Х		
F182	Pulse Feed-back Fault	Х		PWM disabled for 1s and limited auto reset.
F183	IGBT+Temper. Overload		Х	
F185	Precharge Contac Fault		X	
F186	Temp. Fault Sensor 1		Х	
F187	Temp. Fault Sensor 2		Х	
F188	Temp. Fault Sensor 3		Х	
F189	Temp. Fault Sensor 4		X	
F190	Temp. Fault Sensor 5		Χ	
A191	Temp. Alarm Sensor 1	X		
A192	Temp. Alarm Sensor 2	X		
A193	Temp. Alarm Sensor 3	X		
A194	Temp. Alarm Sensor 4	X		
A195	Temp. Alarm Sensor 5	X		
A196	Alarm Cable Sensor 1	X		
A197	Alarm Cable Sensor 2	X		
A198	Alarm Cable Sensor 3	X		
A199	Alarm Cable Sensor 4	X		
A200	Alarm Cable Sensor 5	X		
A211		X	X	
F228			X	
F229	Anybus Offline		X	
F230	Anybus Access Error		X	
F233				
E235	CANopen Comm. Error		X	
F236	Master Idle		X	
F237	DNet Connect Timeout		X	
F238	Clear Mode Profibus		X	
F239	Profibus Offline		X	
F240	Access Error Prof Interf		X	
A300	Temper High IGBT U B1	X		
F301	Overtemper IGBT U B1		Х	
A303	Temper, High IGBT V B1	Х		
F304	Overtemper, IGBT V B1		Х	
A306	Temper. High IGBT W B1	Х		
F307	Overtemper. IGBT W B1		Х	
A309	Temper. High IGBT U B2	Х		
F310	Overtemper. IGBT U B2		Х	
A312	Temper. High IGBT V B2	Х		
F313	Overtemper. IGBT V B2		Х	
A315	Temper. High IGBT W B2	Х		
F316	Overtemper. IGBT W B2		Х	
A318	Temper. High IGBT U B3	Х		
F319	Overtemper. IGBT U B3		Х	
A321	Temper. High IGBT V B3	Х		
F322	Overtemper. IGBT V B3		Х	
A324	Temper. High IGBT W B3	Х		
F325	Overtemper. IGBT W B3		Х	
A327	Temper. High IGBT U B4	Х		
F328	Overtemper. IGBT U B4		Х	
A330	Temper. High IGBT V B4	Х		
E331	Overtemper IGBT V B4		X	

#### **FIRE MODE**

Fault/Alarm	Description	Enabled	Disabled	Comments
A333	Temper. High IGBT W B4	Х		
F334	Overtemper. IGBT W B4		Х	
A336	Temper. High IGBT U B5	Х		
F337	Overtemper. IGBT U B5		Х	
A339	Temper. High IGBT V B5	Х		
F340	Overtemper. IGBT V B5		Х	
A342	Temper. High IGBT W B5	Х		
F343	Overtemper. IGBT W B5		Х	
A345	High Load on IGBT Ph.U B1	Х		
F346	Overload on IGBT Ph.U B1		Х	
A348	High Load on IGBT Ph.V B1	Х		
F349	Overload on IGBT Ph.V B1		Х	
A351	High Load on IGBT Ph.W B1	Х		
F352	Overload on IGBT Ph.W B1		Х	
A354	High Load on IGBT Ph.U B2	Χ		
F355	Overload on IGBT Ph.U B2		Х	
A357	High Load on IGBT Ph.V B2	X		
F358	Overload on IGBT Ph.V B2		Х	
A360	High Load on IGBT Ph.W B2	X		
F361	Overload on IGBT Ph.W B2	X	X	
A363	High Load on IGBT Ph.U B3	X		
F364	Uverload on IGBT Ph.U B3	X	X	
A366	High Load on IGBT Ph.V B3	X	X	
F367	Overload on IGBT Ph.V B3	X	X	
A369	High Load on IGBT Ph.W B3	X	X	
F370	Uverload on IGBT Ph.W B3	V	X	
A372	High Load on IGBT Ph.U B4	X	V	
F373	Uverload on IGBT Ph.U B4	V	X	
A375	Norland on IGBT Ph.V B4	X	V	
F370	High Lood on ICPT Dh W P4	V	A	
E370	Overlead on ICBT Ph W R4		Y	
F379	High Load on ICBT Ph U P5	v		
F382	Overload on IGBT Ph II B5		Y	
A384	High Load on IGBT Ph V B5	X		
F385	Overload on IGBT Ph V B5		X	
A387	High Load on IGBT Ph W B5	X		
F388	Overload on IGBT Ph W B5		Х	
A390	Alarm Unbal, Curr.B1 Ph.U	Х		
A391	Alarm Unbal. Curr.B1 Ph.V	Х		
A392	Alarm Unbal, Curr.B1 Ph.W	Х		
A393	Alarm Unbal, Curr.B2 Ph.U	Х		
A394	Alarm Unbal. Curr.B2 Ph.V	Х		
A395	Alarm Unbal. Curr.B2 Ph.W	Х		
A396	Alarm Unbal. Curr.B3 Ph.U	Х		
A397	Alarm Unbal. Curr.B3 Ph.V	Х		
A398	Alarm Unbal. Curr.B3 Ph.W	Х		
A399	Alarm Unbal. Curr.B4 Ph.U	Х		
A400	Alarm Unbal. Curr.B4 Ph.V	Х		
A401	Alarm Unbal. Curr.B4 Ph.W	Х		
A402	Alarm Unbal. Curr.B5 Ph.U	Х		
A403	Alarm Unbal. Curr.B5 Ph.V	Х		
A404	Alarm Unbal. Curr.B5 Ph.W	Х		
F406	Overtemper. Brake Module		Х	
F408	Refrigerat. System Fault		Х	
F410	IPS External Fault		Х	
F412	Rectifier Overtemper.		Х	
F414	Ext. Rectif. Fault		Х	
A415	Ext. Rectif. High Temper.	Х		
F416	Fault Unbal. Curr.IGBT		Х	
F418	Control Air Overtemper.		Х	
A700	Detached HMI	Х		
F701	Detached HMI		X	

#### FIRE MODE

Fault/Alarm	Description	Enabled	Disabled	Comments
A702	Inverter Disable	Х		
A704	Two Movem. Enabled	Х		
A706	Refer. Not Program.SPLC	Х		
A708	SoftPLC Not Running	Х		
F709	SoftPLC Not Running		Х	
F711	SoftPLC Failure		Х	
F750 to F799	SofIPLC User Failures		Х	
F807	CAN Without Supply		Х	
F809	Bus Off		Х	
F811	CANopen Communication Error		Х	
F817	Lag Error		Х	
F821	Invalid PLC Firmware		Х	
F823	Disconnected HMI		Х	
F825	PLC11 Flash Fault		Х	
F827	Memory Card with Invalid Data		Х	
F829	PLC11 Watchdog		Х	
F950 to F999	PLC11 Users Failures		X	

To prevent the drive warranty from being voided during commissioning of the fire mode function, use the test mode. This mode allows full testing of the fire mode function, as it was designed without any fault being disabled. To run this mode, set P0000 to P0193. In the test mode, the drive will show alarm A211.

#### **1.1 GENERAL RECOMMENDATIONS**

A list of recommendations is described to maximize the functionality of the fire mode function. The points are:

- The test mode of the fire mode function must be used for function tests without voiding the drive warranty.
- Enable, configure and test the Flying Start (FS) function according to the control method used, enabling, after a trip of the drive, to control the motor, still in motion, again.
- Increase the value of the torque current limitation following the configuration described in the programming manual according to the control method used. This can avoid potential problems caused by torque current limitation.
- Enable DC link voltage regulation following the configuration described in the programming manual according to the control method used. This can prevent unnecessary drive stops.

#### **1.2 SETTING THE UP FIRE MODE STEP BY STEP**

Follow the steps below to configure the fire mode function. Steps 2, 3, 9 and 10 can be skipped if you do not want to run the test mode of the fire mode function.

- 1. Set P0000 to 5 (or current password).
- 2. Set P0200 to 0.
- 3. Set P0000 to 193.
- 4. Set digital input DIx to (32 Fire Mode).
- 5. Set the fire mode parameters (P0579 to P0581).
- 6. Set P0340.
- 7. Set P0320 (1 = flying start or 2 = flying start / ride through).
- 8. Do the tests with the fire mode function, including the flying start operation.
- 9. Set P0200 to 1.

10. Remove 193 from parameter P0000.

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# **2 NEW PARAMETERS**

#### P0579 - Fire Mode Speed Reference

0 to 18000 rpm

#### Adjustable Range:

Properties:

Access groups via HMI:

#### **Description:**

It defines the Speed Reference to be used by the Fire Mode when P0580 = 2.

#### P0580 - Fire Mode Configuration

Adjustable Range:	<ul> <li>0 = Disabled ("Fire Mode" inactive)</li> <li>1 = Enabled (keeps the speed reference/PID setpoint)</li> <li>2 = Enabled (set the speed reference to [P0579] value)</li> <li>3 = Enabled (set the PID setpoint to the value programmed in P0581)</li> <li>4 = Enabled (disables the output; the motor will coast to stop)</li> </ul>	Factory Setting:	0
Properties:	CFG		
Access groups via HMI:			

#### **Description:**

This parameter defines how the Fire Mode function will work in the CFW11 frequency inverter.

#### Table 2.1: Description of the Fire Mode configuration

P0580	Description
0	Fire Mode function is inactive
1	Fire Mode function is active. When the DIx set to Fire Mode is opened (0 V), "Fire" will be shown on the HMI but the Speed Reference or PID setpoint will not change
2	Fire Mode function is active. When the DIx set to Fire Mode is opened (0 V), "Fire" will be shown on the HMI and the Speed Reference will be set automatically to the P0579 value
3	Fire Mode function is active. When the DIx set to Fire Mode is opened (0 V), "Fire" will be shown on the HMI and the PID setpoint will be set automatically to the P0581 value
4	Fire Mode function is active. When the DIx set to Fire Mode is opened (0 V), "Fire" will be shown on the HMI and the output will be disabled. Motor will coast to stop

#### P0581 - Fire Mode PID Setpoint

0.0 % to 100.0 %

Adjustable Range:

Properties:

Access groups via HMI:

#### **Description:**

It defines the setpoint to be used by the Fire Mode when the PID is enabled and P0580 = 3.

Factory 1800 rpm (1500 rpm) Setting:

Factory 0.0 % Setting:

# P0414 - Motor Magnetization Time

Adjustable Range:	0.000 to 9.999 s	Factory Setting:	0.000 s
Properties:			
Access groups via HMI:			

#### **Description:**

This parameter allows setting a motor magnetization time different from 2 x P0412, and then this is the time the inverter considered to indicate the motor is general enabled (or magnetized) after receiving the general enable command.

# **3 CHANGED PARAMETERS**

New option "8 = Fire Mode" to parameter P0006. The options for this parameter are presented below:

#### P0006 - Inverter Status

Adjustable Range:	0 = Ready 1 = Run 2 = Undervoltage 3 = Fault 4 = Self-Tuning 5 = Configuration 6 = DC-Braking 7 = STO 8 = Fire Mode (new status)	Factory Setting:
Properties:	RO	
Access groups via HMI:	09 READ ONLY PARAMETERS	

New option "32 = Fire Mode" to parameters P0263 to P0270. The options for these parameters are presented below:

P0263 - DI1 Function

P0264 - DI2 Function

P0265 - DI3 Function

P0266 - DI4 Function

P0267 - DI5 Function

P0268 - DI6 Function

P0269 - DI7	<b>Function</b>
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#### P0270 - DI8 Function

Adjustable Range:	0 to 31 as in the CFW11 V5.8X Programming Manual 32 = Fire Mode (new option)	Factory Setting:	P0263 = 1 P0264 = 8 P0265 = 0 P0266 = 0 P0267 = 10 P0268 = 14 P0269 = 0 P0270 = 0
Properties:	CFG		
Access groups via HMI:	07 I/O CONFIGURATION 40 Digital Inputs		

#### Description:

**Fire Mode:** By applying +24 V to the digital input programmed for this purpose, the Fire Mode function is disabled. By applying 0 V, the Fire Mode function is enabled, provided that P0580 is set to a nonzero value.

New option 43 = Fire Mode to parameters P0275 to P0279. The options for these parameters are presented below:

#### P0275 - DO1 Function

#### P0276 - DO2 Function

#### P0277 - DO3 Function

#### P0278 - DO4 Function

#### P0279 - DO5 Function

Adjustable Range:	0 to 42 as in the CFW11 V5.8X Pro 43 = Fire Mode (new option)	gramming Manual	Factory Setting:	P0275 = 13 P0276 = 2 P0277 = 1 P0278 = 0 P0279 = 0
Properties:	CFG			
Access groups	07 I/O CONFIGURATION			
via HMI:	41 Digital Outputs			

#### **Description:**

Fire Mode: it signalizes the Fire Mode state.

#### P0340 - Auto-Reset Time

Adjustable Range:	0 to 3600 s	Factory Setting:	0 s
Properties:			
Access groups	01 PARAMETER GROUPS		
via HMI:	45 Protections		

#### **Description:**

When the drive is in the Fire Mode, this parameter sets the time for the autoreset of the safety stop relay fault (F0160). Even with the value of P0340 set to zero, auto-reset is set to 1s.

# **4 NEW INCOMPATIBILITY BETWEEN PARAMETERS**

If any of the combinations listed below occur, the CFW11 goes into the "Config" state.

- 1) Two or more DIx (P0263...P0270) programmed for (32 = Fire Mode).
- 2) P0580  $\neq$  0 and without P0320 programmed for (1 = Flying Start) or (2 = FS/RT).
- 3) P0580  $\neq$  0 and without DIx programmed for (32 = Fire Mode).