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Interested committees:

Title: BS EN IEC 62091 Low-voltage switchgear and controlgear - Controllers for drivers of stationary fire pumps

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## Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

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## Template for comments and secretariat observations

|                  |                        |
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| Date: xx/xx/20xx | Document: ISO/DIS xxxx |
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| 1  | 2                                          | (3)                          | 4               | 5                                                                                                                                  | (6)                                                                      | 7                                                  |
|----|--------------------------------------------|------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|----------------------------------------------------|
| MB | Clause No./ Subclause No./Annex (e.g. 3.1) | Paragraph/Figure/ Table/Note | Type of comment | Commend (justification for change) by the MB                                                                                       | Proposed change by the MB                                                | Secretariat observations on each comment submitted |
|    | 3.1                                        | Definition 1                 | ed              | Definition is ambiguous and needs clarifying.                                                                                      | Amend to read '...so that the mains connector to which no connection...' |                                                    |
|    | 6.4                                        | Paragraph 2                  | te              | The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK. | Delete reference to UV photometer.                                       |                                                    |



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SECRETARIAT:

France

SECRETARY:

Mr Michaël LAHEURTE

OF INTEREST TO THE FOLLOWING COMMITTEES:

TC 2, SC 17A, SC 22G, SC 32B, SC 121B

HORIZONTAL FUNCTION(S):

ASPECTS CONCERNED:

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TITLE:

**Low-voltage switchgear and controlgear – Controllers for drivers of stationary fire pumps**

NOTE FROM TC/SC OFFICERS:

SC121A officers are supporting CD1 of IEC 62091 ED2.

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Figure 1

- Example of a typical arrangement for the electric fire pump controller (FPC) suitable for two power sources, the alternate source being on-site standby power .....

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Figure 2

- Example of a typical arrangement for the electric fire pump controller (FPC) suitable for two power sources, both of which are utilities (with one locked rotor protector) .....

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Figure 3

- Example of a typical arrangement for the electric fire pump controller (FPC) suitable for two power sources, both of which are utilities (with two locked rotor protectors) .....

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Figure 4

- Typical arrangement for the electric fire pump controller (FPC) suitable for a single power source .....

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Figure F.1

- Typical block diagram for the diesel engine fire pump controller suitable for a single phase power source

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## INTERNATIONAL ELECTROTECHNICAL COMMISSION

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### LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR - CONTROLLERS FOR DRIVERS OF STATIONARY FIRE PUMPS –

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International Standard [IEC 62091](#) has been prepared by subcommittee 121A: Low-voltage switchgear and controlgear, of IEC technical committee 121: Switchgear and controlgear.

This second edition cancels and replaces the [first edition](#) published in 2007. It constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a)

b)

The text of this standard is based on the following documents:

| FDIS     | Report on voting |
|----------|------------------|
| XX/XX/XX | XX/XX/XX         |

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

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The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under [webstore.iec.ch](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

## INTRODUCTION

IEC 62091 pertains to life-safety equipment and is based in part on NFPA 20 (2022) *Standard for the Installation of Centrifugal Fire Pumps*. When called upon to work by automatic signal, manual-electric signal or manual-emergency actuation, the controller is expected to start the pump driver (motor or diesel engine) due to a fire event. Failure to carry out its task will increase fire damage to the building, its contents, and people therein.

These controllers are in a RUN state by default. They are intended to be located in compliance with local requirements which generally will place them in pump rooms or pump houses that have some specified degree of fire protection. These locations often have sweating overhead pipes, are possibly sprinklered and are in the vicinity of vaults housing other building distribution equipment.

Fire pumps are intended to boost water pressure. Many sprinkler systems are assumed to have small leaks for which “Jockey Pumps” (also known as make-up pumps) are installed to maintain desired pressure in the sprinkler pipes, thus preventing the main fire pump from excessive starts and stops. Experience has shown that leakage water flowing through the fire pump (at rest) over long periods of pump inactivity can carry sand, aggregates, rocks, rust and such which collect in the fire pump. These contaminants may prevent normal starting until the pump impeller accelerates to clear the pump housing. This standard recognizes the condition of under-exercised fire pumps by permitting up to 20 s at locked rotor current, whether the starts are “cold starts” (initial starts) or “hot starts” (restarts). Starting a distressed pump may cause temporary or permanent damage to electrical conductors, equipment, and the motor, because shutdown for equipment protection could possibly permit its destruction by fire along with the building and its contents.

Several examples of the construction and installation applications between a fire pump controller and other controllers include the following:

#### 1) all fire pump controllers

- The main circuit conductors and components are considered to be sacrificial (i.e., temporary or permanent damage levels are permitted) during any attempt to start a distressed motor/pump and to keep it operating.
- They are expected to provide a high degree of reliability to start the pump driver automatically and suppress a fire upon sensing a pressure drop in the sprinkler pipe or by other automatic fire detection equipment.
- Failures in external control circuits should not prevent operations of pumps from all other internal or other external means.
- External control circuits are expected to be arranged so that failure of any external circuit (open or short-circuit) will not prevent operation of pump(s) from all other internal or external means. Breakage, disconnecting, shorting of the wires or loss of power to these circuits can cause continuous running of the fire pump but should not prevent the controller(s) from starting the fire pump(s) due to causes other than these external circuits.
- External automatic starting means should be accomplished by opening a normally closed contact on the external means to de-energize a normally energized control circuit in the controller.
- While external start buttons or other starting means are permitted, the controller should not be equipped with any means to accommodate remote stopping (a remote STOP button should not be used).
- Nuisance starts are permitted in the case where a failure of internal control components might cause the motor to start running.

## 2) **electric motor fire pump controllers**

- They are expected to include means for external, manual mechanical operation of the controller in the event of loss of ability to close the contactor electrically/magnetically.
- Thermally reactive over-current protective devices should not be permitted. The controller should provide short-circuit and locked rotor protection only.
- Releases of the FPC-overcurrent protective devices (short-circuit protective and locked rotor protective devices) are expected to permit it to carry 300 % of rated operational motor current for an extended period of time.

## 3) **diesel engine fire pump controllers**

- Should provide means to automatically exercise the engine on a weekly basis.
- When an automatic or manual signal to start/run exists, (except under TEST) the controller should not shut down the engine for any reason except OVERSPEED. When in TEST mode, the controller may shut down under low oil pressure and high engine temperature conditions. The two conditions mentioned illustrate the sacrificial nature while fighting a fire.

Therefore, the most significant purpose of this standard is to characterize the unique features of fire pump controllers.

An installation with two fire pumps will increase the reliability and safety of the installation, especially if the two fire pumps are supplied from two different power supplies. This is especially true during maintenance or repairing of a single controller, as fire protection is still being maintained by the other fire pump.

The most significant purpose of this standard is to characterize the unique features of fire pump controllers. A further purpose is to prescribe a procedure for exercising the controllers to verify that the unique features are operative. For the purpose of this standard, this procedure is described as the “fire pump controller test protocol”.

The object of this standard is to state the following:

- 4) the unique characteristics of fire pump controllers, their associated equipment and their operational functions;
- 5) the tests intended for confirming that these conditions have been met, and the methods to be adopted for these tests;
- 6) the information to be given with the equipment, or in the manufacturer's literature.

In this context, this standard gives the requirements for all of the electrical functions associated with both the electric motor-driven and the diesel engine-driven fire pumps. Special applications such as explosive atmospheres, nuclear installations, ships, aircraft, etc. are not covered by this standard. Referring to electric power sources, the requirements of this standard apply only to the extent that they place limits on the nature, behaviour and characteristics of the electrical energy that is supplied to the service entrance (see [IEC 60364-5-55](#)).

# LOW-VOLTAGE SWITCHGEAR AND CONTROLGEAR - CONTROLLERS FOR DRIVERS OF STATIONARY FIRE PUMPS –

## 1 Scope

This International Standard applies to controllers intended for starting, controlling, and stopping stationary fire pumps, including automatic and non-automatic types for alternating current electric motor or diesel engine-driven fire pumps. It is anticipated that a controller only controls a single driver.

Controllers for electric motor-driven fire pumps always include suitable short-circuit protection as an integral part of the controller. These controllers may include an integral power transfer switch. These controllers are rated 1 000 V a.c. maximum, and for controllers covered in [Annex F](#), from 1000 V to 15 kV a.c. maximum.

Controllers for diesel engine-driven fire pumps include electrical circuits that operate various control and supervisory functions, such as remote control (starting), alarms, signals, indicators, and the proper operation of battery chargers.

The requirements of this standard apply neither to the method nor to the means by which the electrical energy is generated. In addition, they do not apply to the installation between the origin of the installation and the fire pump controller, which are to be found in the [IEC 60364 series](#). This standard does not apply to diesel engine-driven electric generators which may be associated with a stationary fire pump installation.

EMC considerations are correlated with other IEC standards for similar products:

- a) for electric fire pump controllers, EMC considerations are covered by this standard, and
- b) for diesel engine fire pump controllers, d.c. batteries are the intended source of electrical control power.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60335-2-29, *Household and similar electrical appliances - Safety - Part 2-29: Particular requirements for battery chargers*

IEC 60364 (all parts), *Electrical installations of buildings*

IEC 60364-5-55:2011, *Electrical installations of buildings - Part 5-55: Selection and erection of electrical equipment - Other equipment*

IEC 60364-5-55:2011 - Amendment 2 (2016), *Electrical installations of buildings - Part 5-55: Selection and erection of electrical equipment - Other equipment*

IEC 60364-5-55:2011 - Amendment 1 (2012), *Electrical installations of buildings - Part 5-55: Selection and erection of electrical equipment - Other equipment*

IEC 60439-1:2020, *Low-voltage switchgear and controlgear assemblies - Part 1: Type-tested and partially type-tested assemblies*

IEC 60529:1989, *Degrees of protection provided by enclosures (IP code)*

IEC 60529:1989 - Amendment 2 (2013), *Degrees of protection provided by enclosures (IP code)*

IEC 60529:1989 - Amendment 1 (1999), *Degrees of protection provided by enclosures (IP code)*

IEC 60664-1:2020 - Amendment 1(2024), *Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests*

IEC 60664-1:2020, *Insulation coordination for equipment within low-voltage systems - Part 1: Principles, requirements and tests*

IEC 60695-11-10:2013, *Fire hazard testing - Part 11-10: Test flames - 50 W horizontal and vertical flame test methods*

IEC 60947-1:2024, *Low-voltage switchgear and controlgear - Part 1: General rules*

IEC 60947-2:2024, *Low-voltage switchgear and controlgear - Part 2: Circuit-breakers*

IEC 60947-3:2020, *Low-voltage switchgear and controlgear - Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units*

IEC 60947-4-1:2023, *Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters*

IEC 60947-4-1:2023 - Amendment 1 (2002), *Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters*

IEC 60947-4-1:2023 - Amendment 2 (2005), *Low-voltage switchgear and controlgear - Part 4-1: Contactors and motor-starters - Electromechanical contactors and motor-starters*

IEC 60947-4-2:2018, *Low-voltage switchgear and controlgear - Part 4-2: Contactors and motor-starters - AC semiconductor motor controllers and starters*

IEC 60947-4-2:2018 - Amendment 1 (2024), *Low-voltage switchgear and controlgear - Part 4-2: Contactors and motor-starters - AC semiconductor motor controllers and starters*

IEC 60947-5-1:2024, *Low-voltage switchgear and controlgear - Part 5-1: Control circuit devices and switching elements - Electromechanical control circuit devices*

IEC 60947-6-1:2025, *Low-voltage switchgear and controlgear - Part 6-1: Multiple function equipment - Transfer switching equipment*

IEC 61000-3-12:2011 - Amendment 1 (2021), *Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase*

IEC 61000-3-12:2011, *Electromagnetic compatibility (EMC) - Part 3-12: Limits - Limits for harmonic currents produced by equipment connected to public low-voltage systems with input current > 16 A and ≤ 75 A per phase*

IEC 61000-4-2:2008, *Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test*

IEC 61000-4-3:2020, *Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4:2012, *Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test*

IEC 61000-4-5:2014 - Amendment 1 (2017), *Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test*

IEC 61000-4-5:2014, *Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test*

IEC 61000-4-6:2023, *Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-11:2020, *Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests*

IEC 61032:1997, *Protection of persons and equipment by enclosures - Probes for verification*

IEC 61800-5-1:2022, *Adjustable speed electrical power drive systems - Part 5-1: Safety requirements - Electrical, thermal and energy*

CISPR 11:2015 - Amendment 2 (2019), *Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement*

CISPR 11:2015, *Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement*

CISPR 11:2015 - Amendment 1 (2016), *Industrial, scientific and medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement*

### 3 Terms and definitions

For the purposes of this document, the relevant terms and definitions given in [IEC 60947-1](#), together with the following terms and definitions, apply.

#### 3.1

##### **fire pump controller (FPC)**

controller intended to control a fire pump electric motor or a fire pump diesel engine

#### 3.2

##### **controller**

equipment that serves to control, in some predetermined manner, the electric power delivered to the apparatus to which it is connected

#### 3.3

### **circuit breaker**

mechanical switching device, capable of making, carrying and breaking currents under normal circuit conditions and also making, carrying for a specified duration and breaking currents under specified abnormal circuit conditions such as those of short circuit

### **3.4**

#### **enclosure**

housing affording the type and degree of protection suitable for the intended application

Note 1 to entry: This document provides requirements for the enclosure according to [IEC 60529](#) as well as additional requirements for mechanical and environmental impact. The purpose of the additional requirements is to ensure the enclosure's ability to provide basic protection under the environmental conditions specified by the manufacturer.

[SOURCE: [IEC 60050-151:2001](#), [151-13-08](#), modified - Note to entry added.]

### **3.5**

#### **fire pump**

pump dedicated to delivering a specified rate of water flow at a specified pressure to the fire extinguishing system of a premises

### **3.6**

#### **fire pump controller test protocol**

procedure for exercising fire pump controllers to verify their compliance with the requirements of this standard

### **3.7**

#### **foam pump**

pump dedicated to delivering a specified rate of foam concentrate to the system proportioner in the water fire extinguishing system of a premises

### **3.8**

#### **system proportioner**

device or coordinated group of devices which introduces foam concentrate in a prescribed proportion into the fire water stream

### **3.9**

#### **foam pump controller**

controller intended to control a foam concentrate pump for use in fire suppression

### **3.10**

#### **driver**

electric motor or diesel engine that drives the fire pump

### **3.11**

#### **pumping unit**

pump, driver and controller

### **3.12**

#### **diesel engine fire pump controller**

equipment that serves to govern, in some predetermined manner, the diesel engine power delivered to the apparatus to which it is connected.

### **3.13**

**diesel engine foam pump controller**

controller intended to control a diesel engine-driven foam concentrate pump

**3.14**

**electric fire pump controller**

controller intended to control an electric motor-driven fire pump

**3.15**

**dwelling fire pump controller**

controller intended to control an electric motor-driven dwelling fire pump

Note 1 to entry: These fire pumps are intended for use primarily in domestic residences. They are typically limited to one- and two-family units and manufactured homes.

**3.16**

**electric foam pump controller**

controller intended to control an electric motor-driven foam concentrate pump

**3.17**

**automatic control**

control of an operation without human intervention

**3.18**

**non-automatic control**

control of an operation by human intervention

**3.19**

**externally operable**

capable of being operated without the need to remove covers or open an enclosure

**3.20**

**lockout feature**

externally accessible means to preclude an automatic controller from responding to a start signal

**3.21**

**over-current**

current exceeding the rated current

Note 1 to entry: For the purpose of this standard, over-current protection includes motor locked-rotor and short-circuit protection only.

**3.22**

**service equipment**

necessary equipment, usually consisting of a circuit-breaker or switch and fuses and their accessories, located near the point of entrance of supply conductors to a building or other structure, or an otherwise defined area, and intended to constitute the main control and means to cut-off the supply

**3.23**

**type-tested device**

device conforming to an established type, comprised of elements (components, devices, equipment) combined and rated as a unit, replicating the constructional and performance features of the typical device which has been verified previously to be in accordance with a designated standard

### 3.24

#### **electromagnetic contactor**

contactor in which the force for closing the normally open main contacts or opening the normally closed main contacts is provided by an electromagnet (see [IEC 60947-4-1](#))

### 3.25

#### **automatic transfer switching equipment (automatic power transfer switch)**

self-acting equipment containing one or more switching devices and associated operating mechanism for monitoring supply circuits and for transferring one or more load circuits from one supply to another supply (see [IEC 60947-6-1](#)).

### 3.26

#### **disconnecter**

mechanical switching device which provides, in the open position, an isolating distance in accordance with specified requirements

Note 1 to entry: A disconnecter is capable of opening and closing a circuit when either negligible current is broken or made, or when no significant change in the voltage across the terminals of each of the poles of the disconnecter occurs. It is also capable of carrying currents under normal circuit conditions and carrying for a specified time currents under abnormal conditions such as those of short circuit.

[SOURCE: [IEV 441-14-05](#)]

### 3.27

#### **short-circuit protective device**

#### **SCPD**

device intended to protect a circuit or parts of a circuit against short-circuit currents by interrupting them

### 3.28

#### **electromagnetic environment**

totality of electromagnetic phenomena existing at a given location

Note 1 to entry: In general, the electromagnetic environment is time-dependent and its description may need a statistical approach.

[SOURCE: [IEV 161-01-01](#)]

### 3.29

#### **electromagnetic disturbance**

any electromagnetic phenomenon which may degrade the performance of a device, equipment or system, or adversely affect living or inert matter

Note 1 to entry: An electromagnetic disturbance may be an *electromagnetic noise*, an *unwanted signal* or a change in the propagation medium itself.

[SOURCE: [IEV 161-01-05](#)]

### 3.30

#### **electromagnetic compatibility**

## **EMC**

ability of an equipment or system to function satisfactorily in its electromagnetic environment without introducing intolerable electromagnetic disturbances to anything in that environment

[SOURCE: [IEV 161-01-07](#)]

### **3.31**

#### **emission (electromagnetic)**

phenomenon by which electromagnetic energy emanates from a source

[SOURCE: [IEV 161-01-08](#)]

### **3.32**

#### **radio (frequency) disturbance**

electromagnetic disturbance having components in the radio frequency range

[SOURCE: [IEV 161-01-13](#)]

### **3.33**

#### **radio frequency interference**

##### **RFI**

degradation of the reception of a wanted signal caused by radio frequency disturbance

Note 1 to entry: The English words "interference" and "disturbance" are often used indiscriminately. The expression "radio frequency interference" is also commonly applied to a radio-frequency disturbance of an unwanted signal.

[SOURCE: [IEV 161-01-14](#)]

### **3.34**

#### **immunity (to an electromagnetic disturbance)**

ability of a device, equipment or system to perform without degradation in the presence of an electromagnetic disturbance

[SOURCE: [IEV 161-01-20](#)]

### **3.35**

#### **transient (adjective and noun)**

pertaining to or designating a phenomenon or a quantity which varies between two consecutive steady states during a time interval short compared with the time-scale of interest

[SOURCE: [IEV 161-02-01](#)]

### **3.36**

#### **burst (of pulses or oscillations)**

sequence of a limited number of distinct pulses or an oscillation of limited duration

[SOURCE: [IEV 161-02-07](#)]

### 3.37

#### **voltage surge**

transient voltage wave propagating along a line or a circuit and characterized by a rapid increase followed by a slower decrease of the voltage

[SOURCE: [IEV 161-08-11](#)]

### 3.38

#### **transfer switching equipment (TSE)**

equipment containing one or more switching devices and associated operating mechanism for disconnecting load circuits from one supply and connecting to another supply

[SOURCE: [IEC 60947-6-1:2021](#)]

Note 1 to entry: In addition, manual mechanical operation from one source to the other is included in the fire pump controller.

## 4 Classification

### 4.1 Electric fire pump controller

#### 4.1.1 General

Electric fire pump controllers shall be classified according to [4.1.2](#) to [4.4.5](#).

#### 4.1.2 Low voltage controller

##### 4.1.2.1 Direct online controller

Low voltage controller where full voltage is immediately applied to the motor.

##### 4.1.2.2 Controller with reduced voltage starter

Low voltage controller where voltage is applied in steps or gradually to reach full voltage.

##### 4.1.2.3 Controller with pressure limitation by complete drive module (CDM)

Low voltage controller that gradually increases the speed of the motor until the pressure setting is reached.

### **4.1.3 High voltage (1 kV - 15 kV)**

#### **4.1.3.1 Direct online controller**

High voltage controller where full voltage is immediately applied to the motor.

#### **4.1.3.2 Controller with reduced voltage starter**

High voltage controller where voltage is applied in steps or gradually to reach full voltage.

#### **4.1.3.3 Controller with pressure limitation by complete drive module (CDM)**

High voltage controller that gradually increases the speed of the motor until the pressure setting is reached.

### **4.1.4 Dwelling controller**

Low voltage controller installed in domestic dwellings, limited to 240 V single phase.

## **4.2 Controllers for diesel engine driven fire pumps**

### **4.2.1 Pressure-actuated**

Starting of the engine is initiated by detecting a reduction in water pressure.

### **4.2.2 Non-pressure-actuated**

Starting of the engine is initiated by means other than by detecting a reduction in water pressure, such as deluge valve, flow switch or fire detection equipment.

## **4.3 Controllers for electric motor or diesel engine driven additive (injector) fire pumps**

Special electric fire pump controllers or special diesel engine fire pump controllers intended for the unique requirements of foam concentrate pumps.

## **4.4 Controllers with transfer switch configurations**

### **4.4.1 Integral**

Fire pump controller and transfer switch in one enclosure.

#### **4.4.2 Power source to fire pump**

Incoming terminals of the fire pump controller are fed from remote transfer switching equipment or transfer switching equipment installed in separately mounted enclosure. See [IEC 60947-6-1](#).

#### **4.4.3 Automatic electric fire pump controller**

##### **4.4.3.1 General**

Controller that complies with the requirements of both non-automatic and automatic electric fire pump controllers.

##### **4.4.3.2 Pressure activated**

Starting of the motor is initiated by detecting a reduction in water pressure.

##### **4.4.3.3 Non-pressure-actuated**

Starting of the motor is initiated by means other than by detecting a reduction in water pressure, such as deluge valve, flow switch or fire detection equipment.

#### **4.4.4 Non-automatic electric fire pump controller**

Starting of the motor is initiated by manual electrical means (e.g., push button) or manual mechanical means (e.g., emergency-run mechanical control, see [8.5.2](#)).

Electric fire pump controller with or without power transfer switch

Controllers may be provided for one or two sources of electrical power.

#### **4.4.5 Full voltage or reduced voltage starting**

Controllers may be provided for direct on-line starting (full voltage) or for starting with reduced motor inrush current (reduced voltage). See [8.4.7](#) and [8.4.8](#).

## 5 Characteristics

### 5.1 Electrical quantities

#### 5.1.1 Rated operational voltage ( $U_e$ )

For electric fire pump motors, [subclause 5.3.1.1 of IEC 60947-1:2024](#) applies. For controllers of diesel engines, the rated voltage is single phase, either one phase to neutral or phase to phase.

#### 5.1.2 Rated operational current ( $I_e$ )

The rated operational current for an electric fire pump controller is a value of current which is dictated by the rated operational current of the electric motor which drives the fire pump.

NOTE: In North America, rated operational current is known as full load current (FLA).

In the case of an equipment for direct switching of individual electric motors, the indication of a rated operational current may be replaced (or supplemented) by an indication of the maximum rated power output, at the rated operational voltage of the motor for which the equipment is intended to be connected.

#### 5.1.3 Rated operational power

The units of rated operational power may be expressed in watts or horsepower.

NOTE: [Annex G of IEC 60947-4-1](#) gives values concerning the relationship between rated operational currents and rated operational powers.

#### 5.1.4 Locked-rotor current ( $I_L$ )

The locked-rotor current for an electric fire pump controller is a value of current which is the greatest steady-state r.m.s. current taken from the line with the motor locked, over all angular positions of its rotor, at rated voltage and frequency.

### 5.2 Deleted

### 5.3 Electric fire pump controller

#### 5.3.1 Basic functions

An electric fire pump controller has the following basic functions:

- a) connects (or transfers) the electric motor to the appropriate power supply (primary, alternative, second utility);

- b) starts, controls and stops the operation of the electric drive motor;
- c) provides over-current protection against locked rotor currents and short-circuit currents;
- d) monitors and supervises the operation of the system, and provides appropriate signals and alarms;
- e) to have a general arrangement in compliance with [Figure 1](#), [Figure 2](#), [Figure 3](#) or [Figure 4](#);
- f) initiates a periodic test of the system, e.g. weekly.

The requirements for performing these functions are given in [Clause 8](#).

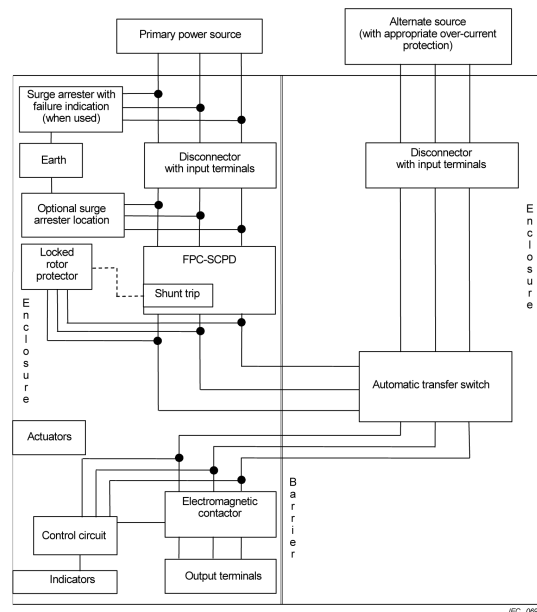


**Figure 1 – Example of a typical arrangement for the electric fire pump controller (FPC) suitable for two power sources, the alternate source being on-site standby power**

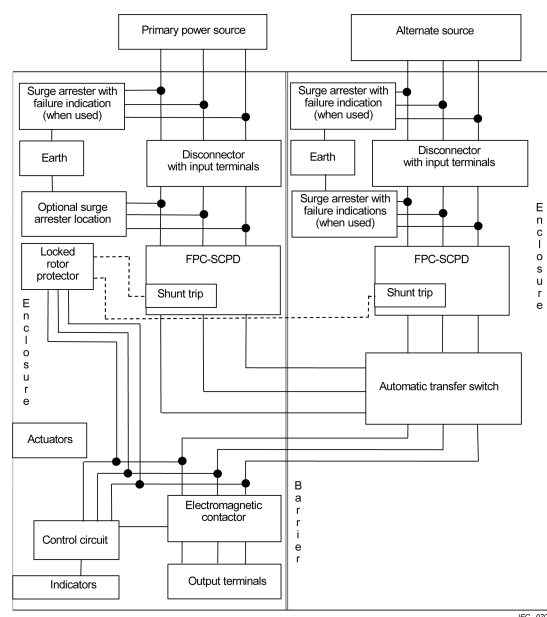


**Figure 2 – Example of a typical arrangement for the electric fire pump controller (FPC) suitable for two power sources, both of which are utilities (with one locked rotor protector)**

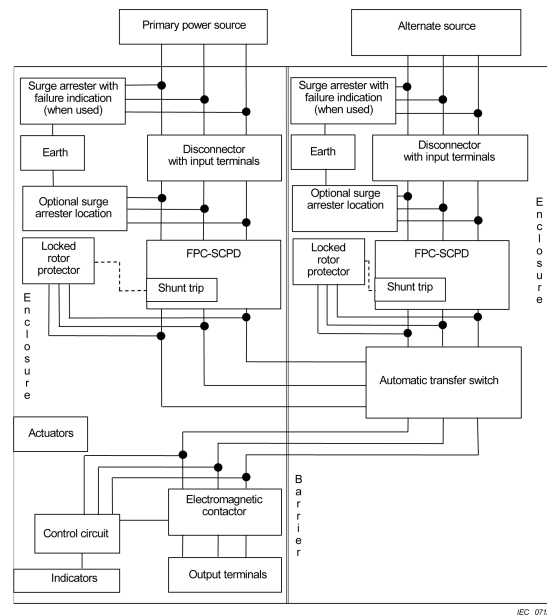


**Figure 3 – Example of a typical arrangement for the electric fire pump controller (FPC) suitable for two power sources, both of which are utilities (with two locked rotor protectors)**

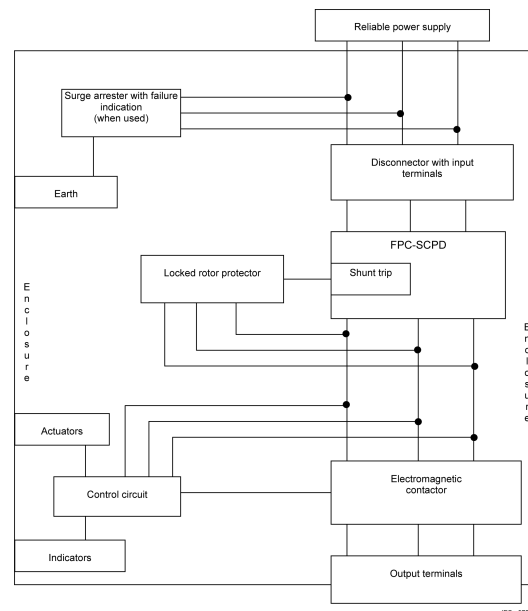


**Figure 4 – Typical arrangement for the electric fire pump controller (FPC) suitable for a single power source**

### 5.3.2 Standard equipment

The electric fire pump controller shall comprise the following equipment:

- a) enclosure;
- b) components (see [8.1](#));
- c) voltage surge arrester;
- d) pressure recorder;
- e) sensors, detectors, monitoring devices, alarms and appropriate signal devices;
- f) periodic test timer (e.g. weekly) or other safe and reliable means providing a minimum running time.

The controller may include other optional equipment that is the subject of agreement between the manufacturer and the user.

The constructional, functional and performance requirements are given in [8.6](#).

### 5.4 Dwelling fire pump controller

Dwelling fire pump controllers are a sub-class of electric fire pump controllers with a restricted scope of application (e.g. one- and two-family dwellings and manufactured homes).

The constructional, functional and performance requirements are given in [Annex E](#).

### 5.5 Diesel engine fire pump controller

A diesel engine is the pump driver for this class of fire pump controller. Starting of the diesel engine is made by means of a controlled signal to initiate starting using auxiliary power other than from the main electrical power circuit, e.g., battery. The constructional, functional and performance requirements are given in [Annex G](#).

### 5.6 Foam pump controller

Foam fire pump controllers are a sub-class of electric fire pump controllers that control a foam concentrate pump for use in fire suppression.

The constructional, functional and performance requirements are given in [Annex C](#).

### 5.7 Characteristics of foam pump controllers are described in [D.5](#) of [Annex D](#). Fire pump controller tests

The requirements for the fire pump controller tests are given in [9.1](#).

## 6 Product information

### 6.1 Rated values and other electrical characteristics

#### 6.1.1 Electric fire pump controller without fire pump power transfer switch

The following ratings and electrical characteristics apply:

- a) rated operational voltage and number of phases;
- b) rated operational current of the motor load;
- c) rated operational power of the motor load;
- d) rated frequency/frequencies
- e) rated conditional short-circuit current;
- f) maximum rated water sensing pressure.

#### 6.1.2 Electric fire pump controller with fire pump power transfer switch

The ratings and characteristics in [F.6](#) of [Annex F](#) of IEC 60947-6-1:2025 apply.

#### 6.1.3 Controller with pressure limitation by complete drive module (CDM)

Ratings and characteristics shall be as provided in [A.6](#) of [Annex A](#).

#### 6.1.4 Ratings and characteristics shall be as provided in [B.6](#) of [Annex B](#). Foam pump controller

Ratings and characteristics shall be as provided in [D.6.1](#) of [Annex D](#).

#### 6.1.5 Dwelling fire pump controller

Ratings and characteristics shall be as provided in [E.6.1](#) of [Annex E](#).

#### 6.1.6 High voltage fire pump controller (1 kV - 15 kV)

Ratings and characteristics shall be as provided in [F.6](#) of [Annex F](#).

#### 6.1.7 Diesel engine fire pump controller

The ratings and characteristics given in [G.6.1](#) of [Annex G](#) apply.

## 6.2 Marking

### 6.2.1 General

Markings shall be indelible and easily legible.

Marking of the manufacturer's name or trademark type designation and serial number is mandatory on the equipment and preferably on the nameplate, if any, in order to permit the complete data to be obtained from the manufacturer.

NOTE: In the USA and Canada, the rated operational voltage  $U_e$  may be marked as follows:

- a) on equipment for use on three-phase - four-wire systems, by both the value of phase-to-earth voltage and that of phase-to-phase voltage, e.g. 277/480 V;
- b) on equipment for use on three-phase - three-wire systems, by the value of phase-to-phase voltage, e.g. 480 V.

The following information shall also be marked and visible after installation:

- direction of movement of the actuator (see 8.5.2 c) and d)), if applicable;
- indication of the position of the actuator (see 8.5.2 c) and d));
- approval or certification mark, if applicable;
- terminal identification and marking.

All fire pump controllers shall be provided with a warning marking to alert qualified persons of potential electric arc flash hazards. The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

### 6.2.2 Identification

Controllers shall be marked, in a position visible after installation, with the following information:

- a) enclosure IP rating;
- b) reference "IEC 62091", if the manufacturer claims compliance with this standard;
- c) electric fire pump controller or diesel engine fire pump controller;
- d) non-pressure-actuated fire pump controller (not required if not equipped with water pressure control).

These identifications shall be installed on the equipment, preferably on the nameplate.

NOTE: The purpose of these identifications is to provide the user with additional application information.

Controllers shall be provided with a marking, visible during installation, stating:

- e) that no ancillary apparatus (e.g. jockey (make-up) pump) shall be connected to the fire pump controller;
- f) that only those devices indicated on the controller diagram(s) shall be connected to the controller;
- g) suitable for use in environment E-III according to IEC 60947-1:2024 (see 7.4);