

—
INSTALLATION AND OPERATING INSTRUCTION

DC Fuse Monitor

OFD



Introduction

OFD fuse monitors signal a blown fuse in a switch fuse or a fuse base that is connected to a DC supply circuit.

OFD products

OFD110

OFD500

Features

- The condition of a fuse is indicated by two LEDs (green and red) and two auxiliary contacts (NO and NC).
- OFD is powered from the DC main circuit and it starts to operate once the DC circuit is connected.
- The fuse monitor is automatically reset after the blown fuses have been replaced.
- Mounting on the side of OS switch fuses, onto DIN rail or with screws.
- Operates with all standard fuses.
- Fixed threshold voltage level on standard devices.
- The functionality of the device is based on patented cross measurement over the fuses.
- All wires are ETFE insulated.

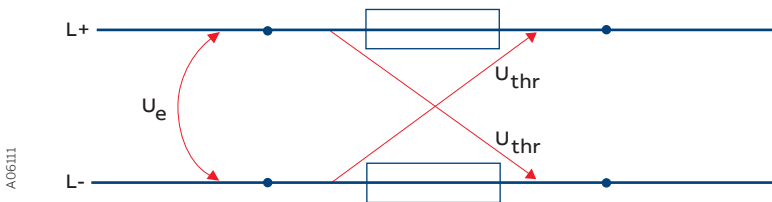


Fig. 1 OFD rated voltage U_e and threshold voltage U_{thr}

The operating voltage range of the OFD fuse monitor is the range defined by rated voltage U_e , e.g. OFD500EA 135...550 VDC. The OFD device is powered in front of the fuses from the supply side + and - poles. The functionality of the device is based on patented cross measurement over the fuses (U_{thr}). The value of U_{thr} is always standard based on the type of the fuse monitor. See table 1.

The threshold voltage U_{thr} of fuse 1 (L+) is measured between the supply side - pole and load side + pole and equivalently U_{thr} of fuse 2 (L-) is measured between supply side + pole and load side - pole. The fuse monitor is intent to use for one fuse only. On case of several fuses, every fuse needs an invidual monitor.

Type	U_e /[DC]	U_{thr} /[DC]
OFD110EA	45...140 V	21.3 V
OFD500EA	135...550 V	50.1 V

Table 1 Rated and threshold voltages of OFD

Status indication

- A green LED light indicates normal status (voltage on fuse holders).
- A red LED light indicates a fuse blown.
- The green LED turns off, the red LED turns on, and auxiliary contacts give an alarm or a trip signal if fuse is blown.

In the case of a blown fuse, the OFD fuse monitor activates the auxiliary contacts after operating time t_e ($< 4s$) when the voltage U_{thr} has dropped below the deter-

mined voltage limit. Changed status is indicated to the user by a red LED.

Because the functionality of OFD is based on bistable relay, the state of auxiliary contacts remains in the latest state even if the voltage drops down or a fuse is changed or de-energized. When the voltage has returned and the fuse has been changed, the fuse monitor indicates normal status with auxiliary contacts and a green LED after operating time t_e .

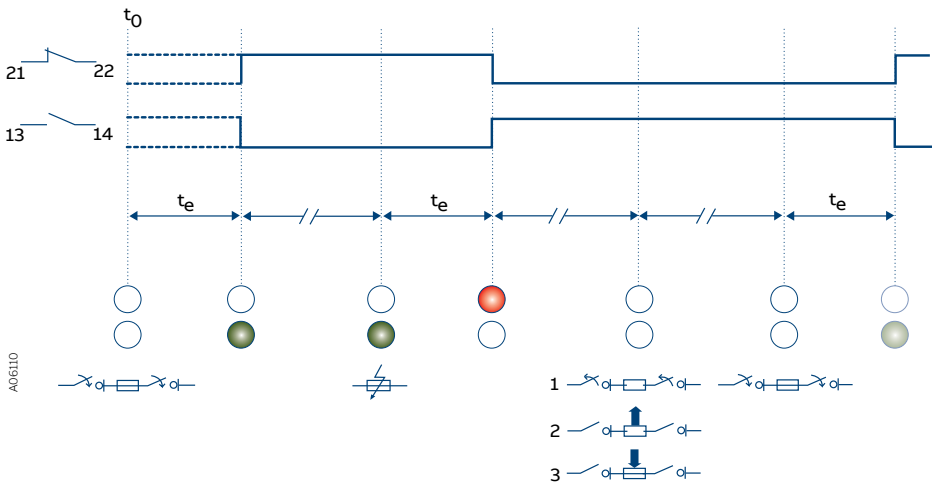
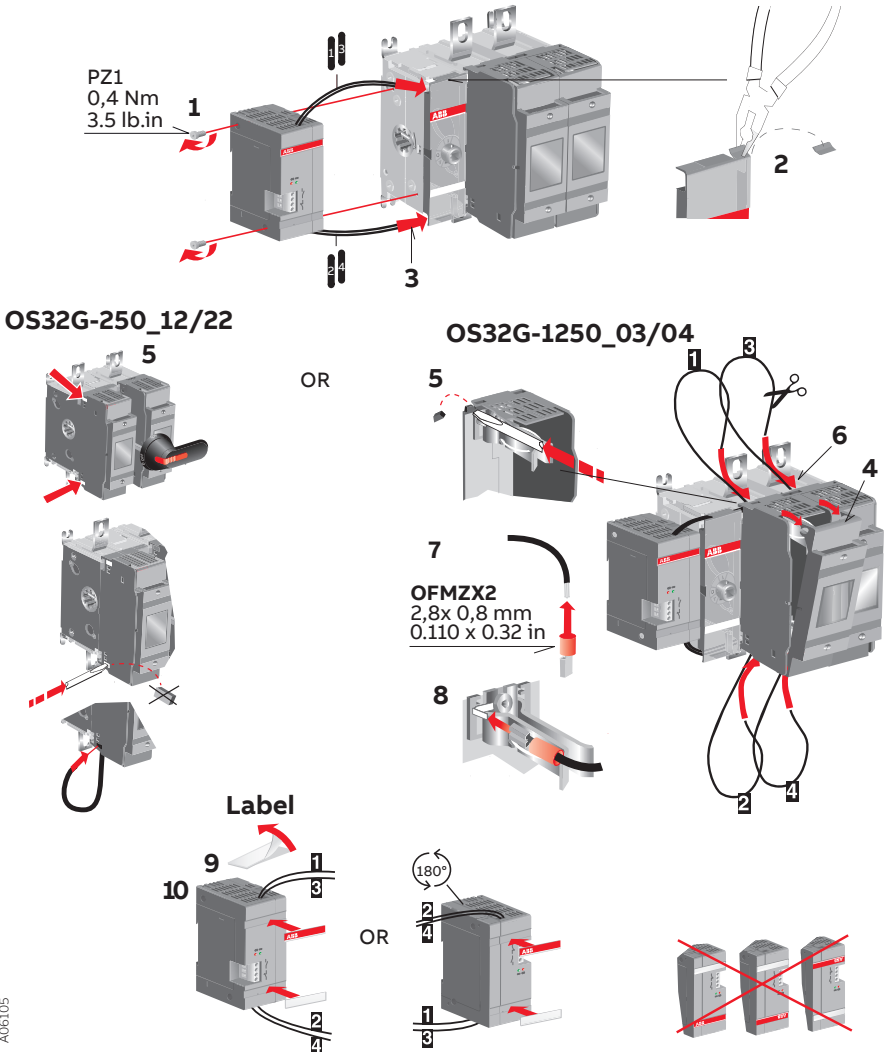


Fig. 2 Timing diagram of OFD



Functioning of OFD is based on bistable relay:
The state of auxiliary contact may vary prior to the device being supplied the first time.

Installation



A06105

Fig. 3 Installation to the OS switch fuse

Installation

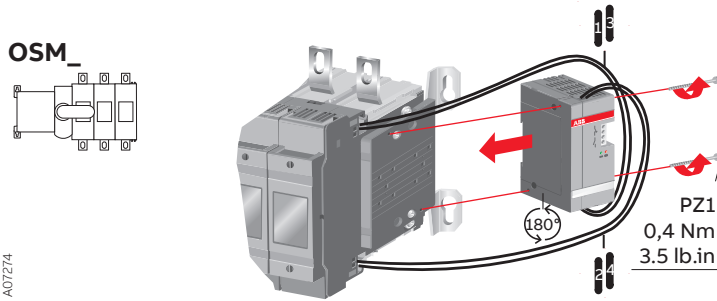


Fig. 4 Installation to the motorized OSM switch fuse

Installation with screws

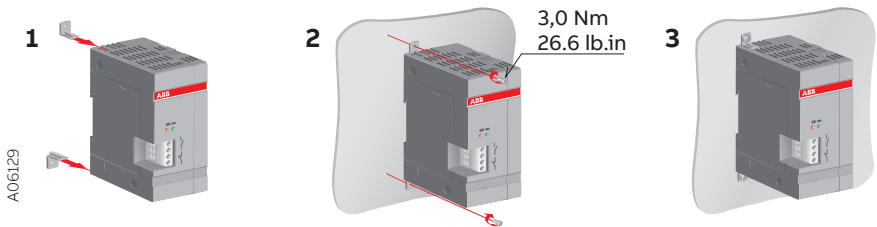
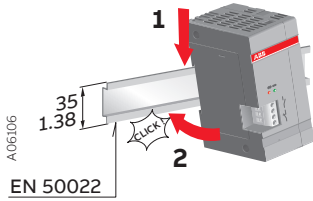


Fig. 5 Screw installation

DIN rail installation

Insert



Remove

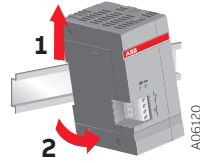


Fig. 6 Installation to DIN rail

Cabling

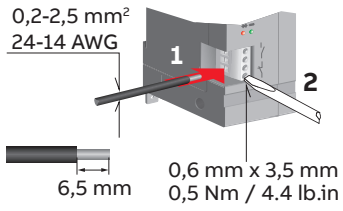


Fig. 7 Cabling

Dimensions

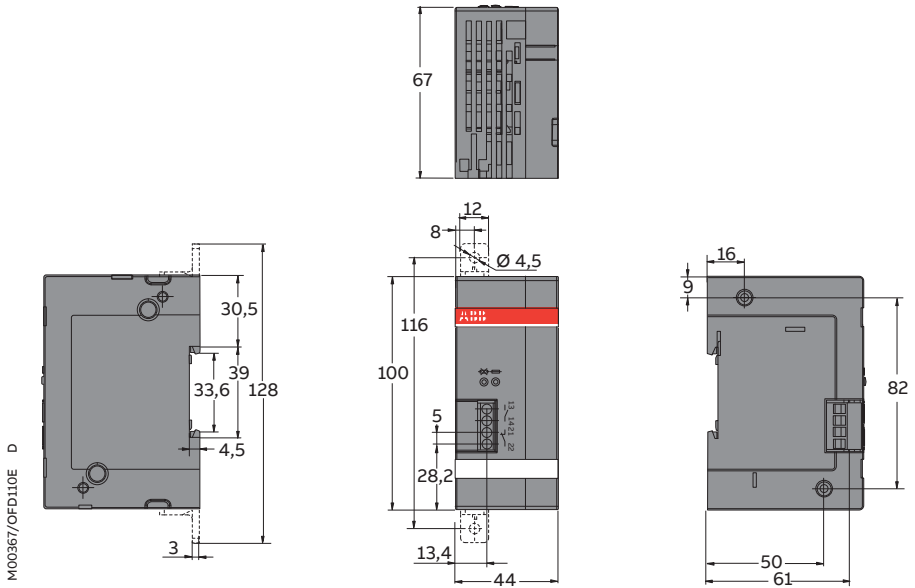


Fig. 8 Dimensions

Connection examples

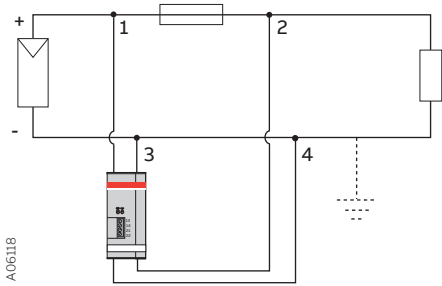


Fig. 9 Connection diagram: One fuse -system, possible minus line grounding

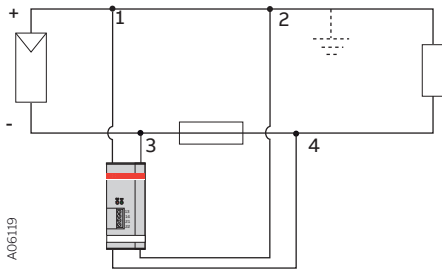


Fig. 10 Connection diagram: One fuse -system, possible plus line grounding

Technical data for OFD110 and OFD500

Input voltage limits	OFD110	OFD500
Rated DC voltage U _n	45...140 V	135...550 V
Power consumption	1 W	2 W
Functional characteristics	OFD110/OFD500	
Operating time t _e	≤ 4 s	
Measuring accuracy	± 5%	
Main circuit connections	OFD110/OFD500	Notice
Supply positive terminal	Cable number 1 L+ Topside	Notice! Wrong polarity prevents intended operation of the device
Supply negative terminal	Cable number 3 L- Topside	
Load positive terminal	Cable number 2 L+ Bottom side	
Load negative terminal	Cable number 4 L- Bottom side	
Connection cables	OFD110/OFD500	
Supply side cables of the main circuit	0,75 mm ² Cu, ETFE insulated, length 700 mm	
Load side cables of the main circuit	0,75 mm ² Cu, ETFE insulated, length 700 mm	
Voltage rating	1000 VDC / 1900 VAC	
Output terminals	OFD110/OFD500	Remark
Normally open (NO) contact	Terminals 13 and 14	Output for alarm signal
Normally Closed (NC) contact	Terminals 21 and 22	Output for trip signal
Solid/Stranded wire section	0,2 – 2,5 mm ² / 0,5 Nm	
Stripping length	6,5 mm	
Rated load, resistive	4 A at 240 V AC	Utilization category AC-1
Rated load, inductive	3 A at 240 V AC	Utilization category AC-15
Rated load, resistive	4 A at 24 V DC	Utilization category DC-1
Rated load, inductive	2 A at 24 V DC	Utilization category DC-13
Dielectric properties (IEC 60947-1)	OFD110	OFD500
Rated impulse withstand voltage (U _{imp}) ₁	2.5 kV	6.0 kV
basic insulation		
All poles connected together/Earth	1.50 kV/1 min 50 Hz	1.89 kV/1 min 50 Hz
All poles connected together/Auxiliary contacts	1.50 kV/1 min 50 Hz	1.89 kV/1 min 50 Hz
Insulation resistance	> 1 MΩ, 250 VDC	> 1 MΩ, 500 VDC
Mechanical characteristics	OFD110/OFD500	
Material of enclosure	Self-extinguishing thermoplastic, UL 94 V-0	
Degree of protection	IP 20	

Technical data for OFD110 and OFD500

Mechanical test	OFD110/OFD500
IEC 60068-2-6 Vibration test	2 Hz to 13,2 Hz: +/- 1 mm 13,2 Hz to 100 Hz: +/- 0,7 g Q does not exceed 5 Duration 90 min at 30 Hz or at each resonance frequency
IEC 60068-2-27 Shock test	Acceleration 150 m/s² peak (15 gn). Pulse duration: 11 ms
Dimensions	OFD110/OFD500
Height, without mounting brackets	100 mm
Height, with mounting brackets	128 mm
Width	44 mm
Depth	67 mm
Environmental conditions	OFD110/OFD500
Ambient air temperature	-25...+55 °C
Altitude of the site of installation	≤ 2000 m
IEC 60068-2-30 Humidity, relative	< 93%, T = -25...+55 °C
IEC 60947-1 Pollution degree	3
Transport and storage	OFD110/OFD500
Ambient air temperature	-40...+70 °C
EMC characteristics	OFD110/OFD500
Immunity; industrial environments (IEC61000-6-2, IEC 60947-1)	
IEC 61000-4-2 Electrostatic discharge immunity test	8 kV (Level 3) Air discharge 4 kV (Level 2) Contact discharge
IEC 61000-4-3 Radiated, radio-frequency, electromagnetic field immunity test	Level 3, 80 MHz...2.7 GHz
IEC 61000-4-4 Electrical fast transient/burst immunity test	Level 3
IEC 61000-4-5 Surge immunity test, Tr/Th 1.2/50 μs (8/20 μs)	Level 2
IEC 61000-4-6 Immunity to conducted disturbances, induced by radio-frequency fields	Level 3
IEC 61000-4-8 Power frequency magnetic field immunity test	Level 5

Technical data for OFD110 and OFD500

Emission; residential, commercial and light-industrial environments (IEC 61000-6-3)

Radiated emission (CISPR 11, Group 1, Class B)	30 dB ($\mu\text{V}/\text{m}$) quasi-peak at 10 m / 30...230 MHz
	37 dB ($\mu\text{V}/\text{m}$) quasi-peak at 10 m / 230...1000 MHz
Conducted emission, DC power port (CISPR 11, Group 1, Class B)	66-56 dB (μV) quasi-peak (Decreasing logarithmically) / 0.15...0.50 MHz
	56-46 dB (μV) average (Decreasing logarithmically) / 0.15...0.50 MHz
	56 dB (μV) quasi-peak / 0.50...5.00 MHz
	46 dB (μV) average / 0.50...5.00 MHz
	60 dB (μV) quasi-peak / 5.0...30 MHz
	50 dB (μV) average / 5.0...30 MHz

Table 2 Technical data



BG	Внимание! Опасно напряжение! Да се монтира само от лице с електротехническа квалификация.
CN	警告！电压危险！只能由专业电工进行安装。
CZ	Varování! Nebezpečné napětí! Montáž smí provádět výhradně elektrotechnik!
DA	Advarsel! Farlig elektrisk spænding! Installation må kun foretages af personer med elektroteknisk ekspertise.
DE	Warnung! Gefährliche Spannung! Installation nur durch elektrotechnische Fachkraft.
EL	Προειδοποίηση! Υψηλή τάση! Η εγκατάσταση πρέπει να γίνεται μόνο από εξειδικευμένους ηλεκτροτεχνικούς.
EN	Warning! Hazardous voltage! Installation by person with electrotechnical expertise only.
ES	¡Advertencia! ¡Tensión peligrosa! La instalación deberá ser realizada únicamente por electricistas especializados.
ET	Hoiatus! Ohtlik pinge. Paigaldada võib ainult elektrotehnika-alane ekspert.
FI	Varoitus! Vaarallinen jännite! Asennuksen voi tehdä vain sähköalan ammattihenkilö.
FR	Avertissement! Tension électrique dangereuse! Installation uniquement par des personnes qualifiées en électrotechnique.
HR	Upozorenje! Opasan napon! Postavljati smije samo elektrotehnički stručnjak.
HU	Figyelmeztetés! Veszélyes feszültség! Csak elektrotechnikai tapasztalattal rendelkező szakember helyezheti üzembe.
IE	Rabhadh! Voltas guaiseach! Ba chóir do dhuine ag a bhfuil saineolas leictreicniúil, agus an té sin amháin, é seo a shuiteáil.
IT	Avvertenza! Tensione pericolosa! Fare installare solo da un elettricista qualificato.
LT	Dėmesio! Pavojinga įtampa! Dirbti leidžiama tik elektrotechnikui patirties turintiems asmenims.
LV	Uzmanību! Bīstami - elektrība! Montāžas darbus drīkst veikt tikai personas, kurām ir atbilstoša elektrotehniskās zināšanas.
MT	Twissija! Vultaġġ perikoluż! Għandu jiġi installat biss minn persuna b'kompetenza eletroteknika.
NL	Waarschuwing! Gevaarlijke spanning! Mag alleen geïnstalleerd worden door een deskundige elektrotechnicus.
NO	Advarsel! Farlig spenning! Montering skal kun utføres av kvalifiserte personer med elektrokompetanse.
PL	Ostrzeżenie! Niebezpieczne napięcie! Instalacji może dokonać wyłącznie osoba z fachową wiedzą w dziedzinie elektrotechniki.
PT	Aviso! Tensão perigosa! A instalação só deve ser realizada por um electricista especializado.
RO	Avertizare! Tensiune periculoasă! Instalarea trebuie efectuată numai de către o persoană cu experiență în electrotehnică.
RU	Осторожно! Опасное напряжение! Монтаж должен выполняться только специалистом-электриком.
SE	Varning! Farlig spänning! Installation får endast utföras av en elektriker.
SK	Varovanie! Nebezpečné napätie! Montáž môže vykonávať iba skúsený elektrotechnik.
SL	Opozorilo! Nevarna napetost! Vgradnjo lahko opravi le oseba z elektrotehničnim strokovnim znanjem.



Contact us

ABB Oy

P.O. Box 622
FI-65101 Vaasa
Finland

abb.com/lowvoltage