

# WOAFDRCBO Series Instructions

The TRADER Wolverine AFDRCBO series of Arc Fault Detection Devices (AFDDs) combined with Residual Current with Overcurrent Circuit Breaker (RCBO) provide a greater level of protection for personnel and property. AFDD's have been proven to reduce the number of incidents of electrical fires in many countries where these devices are already used, particularly in European regions. AFDDs detect & automatically disconnect arc faults that occur in damaged or crushed cables, in loose terminations, and in ageing installations where the insulation quality degrades over time. These two module wide devices feature overcurrent protection, short circuit protection, earth leakage protection (residual current) and arc fault protection, with two poles isolation switching as standard. They have been tested and certified in accordance with AS/NZS 62606 and AS/NZS61009.1 with a fault current rating at 10kA and available from 10A to 40A overcurrent protection in C curve tripping characteristic and Type A RCD function with 30mA Residual current level. The device features automatic test function as per 8.17 of IEC 62606 and is classified as clause 4.1.2 - AFDD unit integrated in a protective device and uses single LED indication.

## Arc Fault LED Indication

After tripping under a fault condition, the fault status indicator will show the fault nature according to the table. LED flashing sequence repeats every 1.5sec for next 10 sec after powering up. A sticker is provided in the packing for installation into switchboards to show the Arc Fault LED flash codes and in addition a QR code on the front of the product can be scanned to show the table where space isn't available in the switchboard/distribution board.

**Series Arc Fault:** 1 Flash - Pause - 1 Flash - Pause - 1 Flash

**Parallel Arc Fault:** 2 Flashes - Pause - 2 Flashes - Pause - 2 Flashes

**Over Voltage Fault:** 3 Flashes - Pause - 3 Flashes - Pause - 3 Flashes

**Self-Test Fault:** 1 Flash - Pause - 1 Flash - Pause - 1 Flash (At Double Rate)

## Safety Measures

The product should be operated in accordance with the valid requirements of electrical safety regulations, as well as other reference documentation regulating the operation of electrical equipment in force in the territory of sale. All installation and preventive maintenance works should be carried out with the voltage disconnected.

According to the electric shock protection method, AFDRCBO's correspond to the 0 class according to IEC 61140 and should be installed in the distribution equipment having protection class at least

1 according to IEC 61140.

Minimum distances from AFDRCBO to metal parts of distribution board products should meet IEC 61009-1.

## Installation Rules

Installation, connection and commissioning of the AFDRCBO should be carried out by a licensed electrician in accordance with AS/NZS 3000.

AFDRCBO is installed on the mounting rail with width of 35mm (DIN rail) in electric switchboards

with degree of protection not lower than IP20 according to IEC 60529.

AFDRCBO has an indicator of the switching position of the contacts. A circuit breaker handle and a colour indicator are used as a pointer. The switching position of the AFDRCBO is indicated by signs and the state of the indicator colours.

Disconnected position - the indicator is green;

Switched on position (I) - red indicator

## ATTENTION

If the neutral conductor is incorrectly connected to the 1P+N AFDRCBO, its instantaneous trip occurs - over voltage protection is activated.

After installation and checking its correctness, apply mains voltage to the electrical installation and turn on the AFDRCBO by moving the operating handle to the "I" position. Press the "TEST" button. The instantaneous trip of the AFDRCBO (disconnection of the circuit protected by the device), moving the handle to the "O" position - "OFF," green color indicator means that the AFDRCBO is functioning properly.

If after switching on the AFDRCBO, immediately or after some time, it switches off, it is necessary to determine the type of fault in the electrical installation according to the following procedure:

- Reset the AFDRCBO with the operating handle. If AFDRCBO is reset, it means that there was earth leakage current, caused by unstable or short-term insulation damage in the electrical installation. Check the serviceability of the AFDRCBO by pressing the "TEST" button.
- If AFDRCBO is not reset, it means that there is a defect of insulation of any electrical wiring, mounting conductors of the switchboard, or the AFDRCBO is defective.

Disconnect all electric cables and reset AFDRCBO. If it is reset, it indicates the presence of an electric cable or equipment with damaged insulation. The fault is detected by connecting the electrical cable in series until the AFDRCBO trips. The damaged electric cable should be disconnected. Check AFDRCBO serviceability by pressing the "TEST" button.

If AFDRCBO continues to trip it is necessary to call a qualified specialist to determine the nature of the damage of the electrical installation or to identify the fault of AFDRCBO.

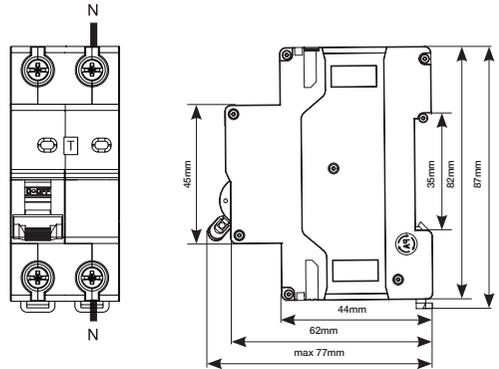
## ATTENTION

It is necessary to check the serviceability of the AFDRCBO once a quarter. The test is carried out by pressing the "TEST" button. Immediate tripping of AFDRCBO and disconnection of the protected electrical installation means that it operates properly.

It is necessary to re-tighten the screw terminals once every 6 months, the pressure of which weakens over time due to cyclic changes in ambient temperature and metal flow of the clamped conductors.

## The AFDRCBO Provides

- Protection of people from electric shock in case direct contact with live parts of electrical installation;
- Protection of people in case of indirect contact with accessible live parts of electrical installation in case of insulation damage;
- Protection against fires resulting from leakage of differential (residual) current to earth in case of insulation damage of live parts;
- Protection against over currents (overload and short circuit) occurring in electrical installations of buildings.
- The AFDRCBO's features a neutral block moulding to help prevent incorrect installation with busbars. Care must be taken to ensure the bar is installed correctly with the insulation block under the terminal screw.
- Provide safety against arc faults that occur in damaged or crushed cables, in loose terminations, and in ageing installations where the insulation quality degrades over time that can cause fires.



Parameter denomination	Value		
Number of poles	1P+N		
Rated operating voltage Ue, V	230		
Rated mains frequency, Hz	50		
Rated insulation voltage, Ui, V	230		
Rated Current in A	10; 16; 20; 25; 32; 40;		
Rated impulse withstand voltage Uimp, V	4000		
Rated residual operating current IΔn, A	0,5- IΔn		
Minimum value of rated residual short-circuit making and braking capacity IΔm, A	2000		
Rated maximum switching capacity Icn, A	10000		
Over-current protection	Yes (in phase poles only)		
Over-voltage protection	operating voltage, V	265±10	
	operating time, ms	15-300	
Type of operating characteristic according to operating conditions in the presence of a DC component	A		
Over-current tripping characteristic	C		
Time-current operating characteristic at calibration reference temperature plus 30°C	Tripping time ranges at the specified currents	1.13 In: t≤1 hour – without tripping	
		1.45 In: t<1 hour – tripping	
		2.55 In: 1 s<t<60s (at In≤32A) – tripping 1 s<t<120s (at In>32A) – tripping	
	Tripping current ranges depending on the type of protective characteristic	C	5In
		C	10In
Cross-sections of conductors to be connected, mm²	1-16		
Material of conductors to be connected	Coper, Aluminum		
Maximum withstanding tightening torque of the output screw when using a screwdriver, NxM*	2.5		
Recommended tightening torque of output screw when using a screwdriver, NxM*	1.5		
Mechanical wear resistance, On-Off cycles, minimum	4000		
Electrical wear resistance, On-Off cycles, minimum	4000		
Sinusoidal vibration	Frequency range, Hz		
	maximum acceleration amplitude, m-s-2 (g)	5 (0.5)	
Rated Duty	Continuous		

### LED Indication Status for Arc Fault

Indication Type	LED Status (The following illustration shows one cycle)	Number of Cycles	Standby Mode
No Fault	Ever Bright	Continuous →	
Leakage Fault	Flash	30 Times →	
Series Arc Fault	Flash	30 Times →	
Parallel Arc Fault	Flash	30 Times →	
Over voltage Fault	Flash	30 Times →	
Self-testing Fault	Flash	Continuous →	
Note	LED indicates, white colour; Fault Indication 1.5 seconds for 30 cycles before entering standby mode.		

Type and parameters of AFDRBCBO		Limit values of operating time and non-operating time, s, for AFDRBCBO type under conditions of alternating residual currents (root-mean-square values)							
Type	In, A	IΔn, A	IΔn	2IΔn	5Δn	5Δn 0.25 A	5-200, 500, A	IΔt	operating and non-operating time
Common	Any Value	less than 0.03	0.3	0.15	-	0.04	0.04	0.04	maximum operating time
		0.03	0.03	0.15	-	0.04	0.04	0.04	
		above 0.03	0.03	0.15	0.04	-	0.04	0.04	

Maximum value of operating time at the alternation residual current (root mean square value) of AFDRBCBO of A type.										
Type and parameters of AFDRBCBO		Maximum value of operating time, s, for AFDRBCBO of A type at the alternation residual currents (root mean square value).								
Type	In, A	IΔn, A	1.4IΔn	2IΔn	2.8IΔn	4IΔn	7IΔn	0.35A	0.5A	350A*
Common	Any Value	less than 0,030	-	0.3	-	0.15	-	-	0.04	0.04
		0.03	0.3	-	0.15	-	-	0.04	-	0.04
		above 0.03	0.03	-	0.15	-	0.04	-	-	0.04

This value is limited to the lower limit of the instantaneous tripping current range according to type C.

Tripping current ranges for A-type RCBO		
Current delay angle α	Tripping current	
	Lower Limit	Upper Limit
0	0.35IΔn	1,4IΔn (IΔn > 0,01 A)
90	0.25IΔn	2IΔn (IΔn ≤ 0,01 A)
135	0.11IΔn	0,01 A

### Capacity Reduction Coefficient When Installing Multiple Products Side by Side

No. Of Parallel AFDRBCBO's	Derating coef.
2-3	0.9
4-5	0.8
6-9	0.7
≥ 10	0.6

Operating time-current characteristics of circuit breaker over-current operation					
Type	Test current	Initial state	Tripping or non-tripping time	Required result	Note
C	1.13 In	Cold	t ≤ 1h (at In ≤ 63A)	without tripping	-
C	1.45 In	Immediately after testing with current of 1.13 In	t < 1h (at In ≤ 63A)	tripping	continuous current build-up for 5s
C	2.55 In	Cold	1 s<t<60s (at In≤32A) 1 s<t<120s (at In>32A)	tripping	-
C	5 In	Cold	t≤0.1s	without tripping	Current is generated by closing the auxiliary switch
C	10 In	Cold	t<0.1s	tripping	