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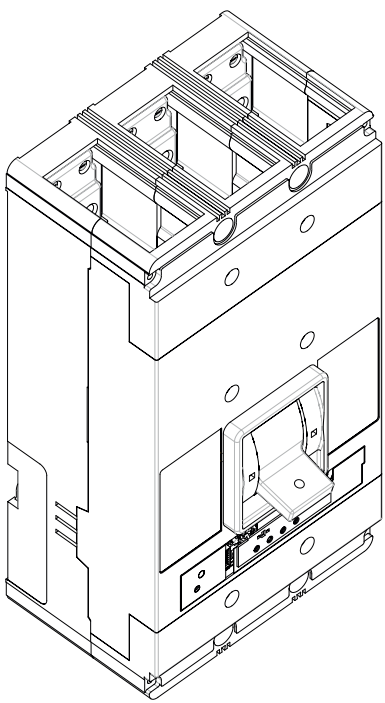
WEG Molded Case Circuit Breakers

UBW1200

User's Manual



WARNING

- Do not attempt to install or perform maintenance on equipment while it is energized. Death, severe personal injury or substantial property damage can result from contact with energized equipment. Always verify that no voltage is present before proceeding with the task, and always follow generally accepted safety procedures.
- WEG is not liable for the misapplication or misinstallation of its products.

The user is cautioned to observe all recommendations, warnings and cautions relating to the safety of personnel and equipment, as well as all general and local health and safety laws, codes and procedures.
The recommendations and information contained herein are based on WEG experience and judgement, but should not be considered to be all-inclusive or covering every application or circumstance which may arise. If any questions arise, contact WEG for further information or instructions.

1. INTRODUCTION

The UBW1200 Circuit Breaker (Figure 1) are 690 V ac maximum rated devices, 600 V for UL applications, and have integral trip units. Available current ratings are up to 1200 for UL applications. Refer to Table 1 for available trip units and Table 2 for available rating plugs. UBW1200 WEG molded case circuit breakers are listed in accordance with Underwriters Laboratories, Inc. Standard UL 489 and satisfy the requirements of the International Electrotechnical Commission Recommendations No. IEC 60947-2.

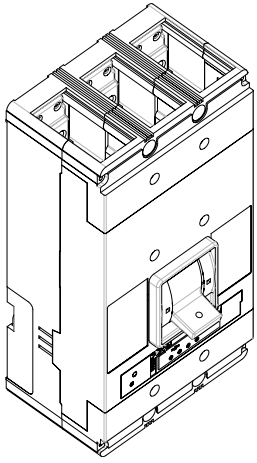


Figure 1: *UBW1200 circuit breaker*

Trip unit functions		Digitrip RMS 310+ trip unit	
		LS	LSI
Long time	Adjustable Ampere rating with adjustable long delay	•	•
Short time	Adjustable short time pick-up with short time delay I^2t ramp	•	
	Adjustable short time delay[1] with adjustable short time pick-up		•
Instantaneous	Fixed instantaneous (override)[2]	•	•

Table 1: *electronic (Digitrip 310+) trip unit types*

Notes: 1) Using trip unit with adjustable delay (LSI), instantaneous pick-up is achieved when the lowest time delay setting (I) is selected for non-arms trip units.
2) Override setting fixed at frame withstand rating.

Trip functions	Range/setting description[2]	
Ampere rating adjustable with IR switch	Trip unit ampere rating (IR)	
	1200 Amp 800 Amp	
Short delay pick-up (adjustable)	In multiples of amperes (I_n) with marks at 2-3-4-5-6-7-8-9x	
Short delay time (adjustable)	I^2t ramp configuration	
Short delay time (adjustable)	Flat response with time delay settings at Instantaneous 120 ms and 300 ms	
Ground fault Pick-up (adjustable)	Trip unit Ampere rating	Trip unit setting
	1200 Amp 800 Amp	
Ground fault time delay	Flat response with time settings of: Inst, 120 ms and 300 ms	

Table 2: *electronic (Digitrip 310+ trip unit function and rating sensing*

Notes: 1) Occurs with short delay time adjustment set at 1.
2) The molded case switch has a fixed instantaneous setting.

The UBW1200 Trip Units are AC only devices that employ microprocessor based technology that provides true RMS current sensing means for proper correlation with thermal characteristics of conductors and equipment. The primary function of the trip unit is circuit protection. This is achieved by analyzing the secondary current signal received from the circuit breaker current sensors and initiating trip signals to the circuit breaker shunt trip when pre-set current levels and time delay setting are exceeded. Low level ground fault protection with an adjustable time delay is supplied when appropriate trip types are selected.

In open air at 40 ºC (104 ºF), a UBW1200 circuit breaker with a 310+ trip unit will carry continuously up to 1200 Amperes without exceeding a 50 ºC (122 ºF) rise at the terminals. The calibration of the trip unit is insensitive to ambient temperatures over a range of -20 to +55 ºC (-4 to 131 ºF). However, the trip unit contains thermal temperature protective circuitry that initiates a trip operation for self-protection if the internal ambient temperature at the printed circuit board (PCB) reaches approximately 90 ºC. For ambient conditions above 40 ºC (104 ºF), derating of the circuit breaker should be considered to avoid exceeding a safe terminal temperature operation range. Consult WEG for recommendations.

1.1. OVERLOAD TRIP

In accordance with standards requirements, the trip unit initiates a trip of the circuit breaker within two hours of an overload of 135 percent, and a trip in less time for higher overloads. A “Thermal Memory” effect prevents the breaker from being reenergized immediately after an overload. A “cooling off” period of up to 5 minutes is required, which allows time for the cabling to cool off.

1.2. SHORT DELAY/INSTANTANEOUS TRIP

For short circuit conditions that exceed the short delay pick-up settings, the trip units initiate a trip after a delay prescribed by the I^2t ramp function for trip units designated LS and SG. A flat response time delay action is provided by trip units designated LSI and LSIG unless the instantaneous (I) setting is selected.

1.3. DC APPLICATION

310+ trip units are suitable for AC application only.

1.4. FIELD TESTING

Test port is available for functional filed testing of the trip unit when connected to test kit.

1.5. INTERNAL ACCESSORIES

Internal accessories mount in the breaker.

Notes: Shunt trip and undervoltage accessories, if required, must be mounted in the left pole.
Digitrip 310+ trip unit versions with ground fault protection are supplied with an auxiliary switch, mounted in the right pole of the trip unit.

This instruction leaflet gives procedures for instalattion and field testing on UBW1200 circuit breakers and describes the different trip unit characteristics. For this publication, the term circuit breaker shall also include the molded case switch.

2. INSTALLATION

The installation procedure consists of inspecting the circuit breaker, installing the accessories and terminals and, if required, mounting the circuit breaker, connecting the line and load conductors and accessory wiring, and adjusting trip settings. Circuit breakers, accessories, and terminals may be supplied in separate packages. To install the circuit breaker, perform the following steps.

2.1. INSPECTION

Make sure the circuit breaker is suitable for the intended installation by comparing nameplate date with existing equipment ratings and system requirements. Inspect the circuit breaker for completeness and check for damage before mounting.

2.2. ACCESSORY INSTALLATION

Note: If required, internal accessory installation in any type of circuit breaker should be done before the circuit breaker is mounted and connected. Refer to the individual accessory instruction leaflets listed above. Terminals are not included.

Terminals must be purchased separately.
For bus connections use:

- M12 - 1.75 bolts for metric style front mounted bus connections, socket cap screws are recommended.
- .500-13 bolts (English Threads) for front mounted bus connections,socket cap screws are recommended.

Terminal Cat. No.	Wire size MCM	Cond. Mat'l	Torq. lb.-in.	Torq. N.m
LT1B2 UBW700	#1-500 (2)	Cu/Al	375	42.4
LT1B3 UBW1000	3/0-400 (3)	Cu/Al	375	42.4
LT1B4 UBW1200	4/0-500 (4)	Cu/Al	375	42.4
LT1B3 UBW1200	500-750 (3)	Cu/Al	450	50.9

Table 3: *torque table (domestic)*

Install accessories per the accessory instruction leaflet.

Caution

- Circuit breaker cover constraints moving parts. Do notoperate the breaker without the cover installed.

2.3. TERMINAL INSTALLATION

2.3.1. 800 A and 1200 A Front Connect

If not already installed, mount terminals as shown in Figure 2. To do this, terminal cover screws must be first be loosened and the terminal covers removed.

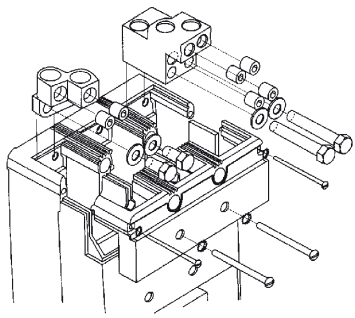


Figure 2: *terminal installation*

To mount the circuit breaker, perform the following steps:

800 A, 1200 A Circuit Breakers

1. For individual surface mounting, drill mounting panel using the drilling plan shown in Figure 3. For dead front cover applications, cut out cover to correct escutcheon dimensions, see Figure 4.

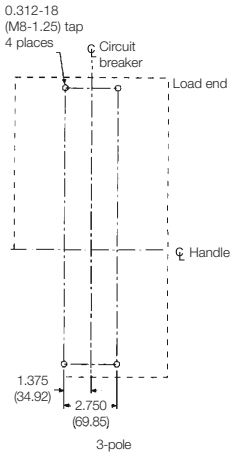


Figure 3: *breaker mounting bolt drilling plan - 800 A, 1200 A circuit breaker*

Note: dimensions in inches (milimeters).

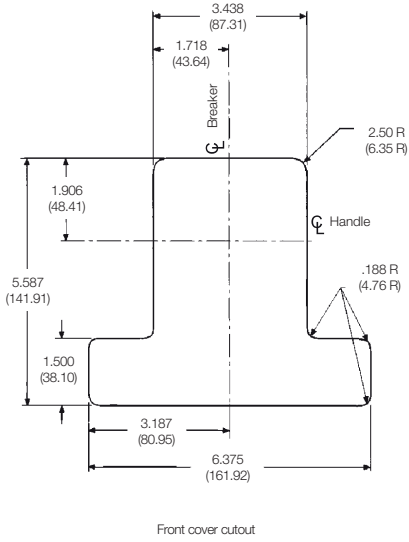


Figure 4: *circuit breaker escutcheon dimensions*

2. If the circuit breaker includes factory or field installed internal accessories, make sure the accessory wiring can be reached when the circuit breaker is mounted.

Note: Labels with accessory connection schematic diagrams are provided on the side of the circuit breaker. A note should be made of the diagrams if the labels cannot be seen when the circuit breaker is mounted.

3. Position the circuit breaker on the mounting surface.
4. Secure the circuit breaker with the supplied hardware.

2.4. CONNECTING LINE AND LOAD CONDUCTORS

Caution

- Overheating can cause nuisance tripping and damage to the circuit breaker. When aluminum conductors are used, the application of a suitable joint compound is recommended to reduce the possibility of terminal overheating.

Connect line and load conductors and accessory leads.
After the circuit breaker is installed and all connections are made, check all mounting hardware and terminal connection hardware for torque loading. Torque values for line/load terminal lugs are given on table in Figure 2. Torque mounting screws for terminals, bus connections and front conductor extensions to 30-35 lb-ft. (41-47 Nm).
Re-install load end and line end covers and secure with pan head screws provided. Torque large screws to 35-45 lb-in. (4.0-5.0 Nm) and small screws to 24-30 lb-in. (2.7-3.4 Nm). When using the terminal LT1B2 UBW700, or when prospective fault currents of cabled installations exceed 65 kA (such as NDC applications), the conductors are to be braced in accordance with Figure 5.

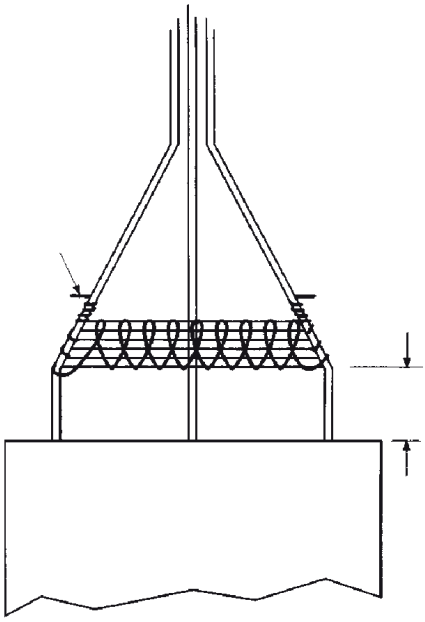


Figure 5: *securement of cable (see caution note for bracing instruction).*

Caution
- Unsupported cables can cause minor personal injury or equipment damage under short circuit conditions.

Wrap conductor cable cables with 3/8” (9.5 mm) nylon or equivalent rope as shown in Figure 5, having a minimum tensile strength of 2000 lbs. (907.2 kg) at 6” (152.4 mm) from terminals and every additional 6” with 5 wraps or every additional 1” (25.4 mm) with 1 wrap.

2.5. ADJUSTING TRIP SETTINGS

The UBW1200 circuit breakers have the trip unit built in as an integral part of the breaker. The trip unit is not field replaceable. The various trip unit settings are described in Section 4. They should be adjusted as required at this point.

3. OPERATION

3.1. MANUAL OPERATION

Manual operation of the circuit breaker is controlled by the circuit breaker handle and the push-to-trip button. The circuit breaker handle has three positions, two of which are shown on the cover in raised lettering to indicate ON and OFF. On the handle,

ON, OFF, and TRIPare also shown by a color-coded strip for each circuit breaker handle position: red for ON, white for TRIP, and green for OFF (see Figure 6). The Push-to-Trip button checks the circuit breaker tripping function and may be used to periodically exercise the operating mechanism.

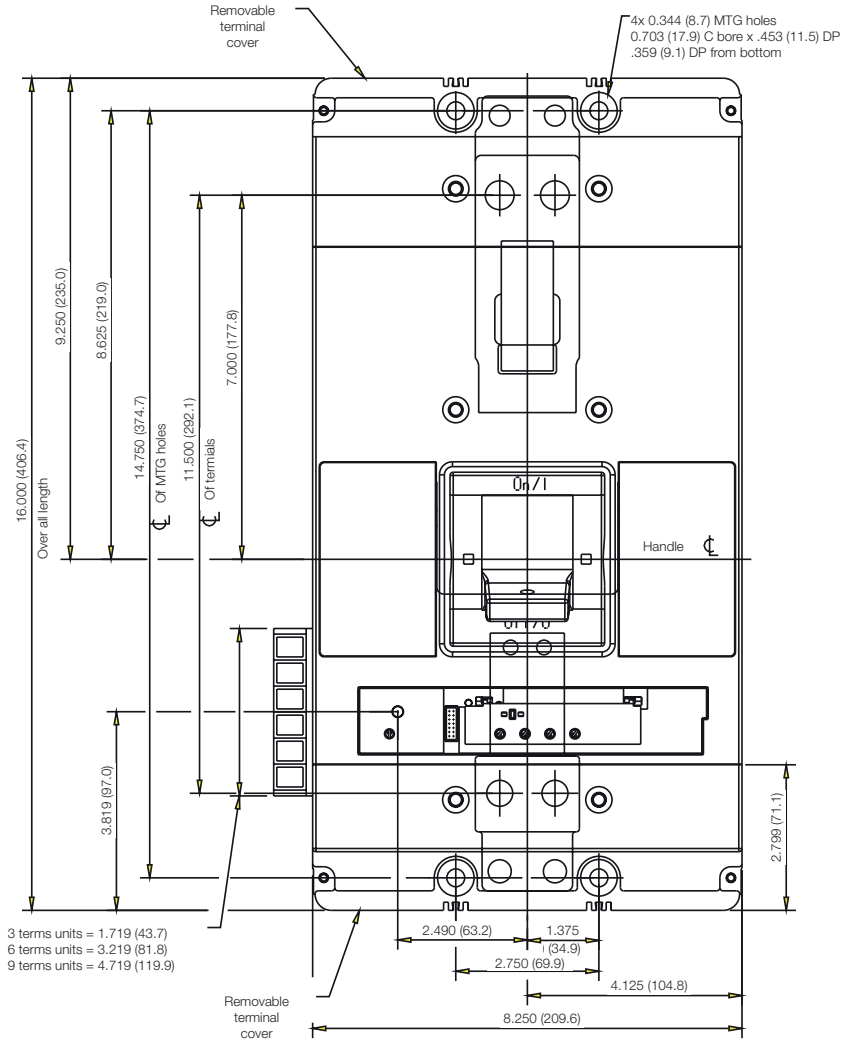


Figure 6: *circuit breaker manual controls*

3.2. CIRCUIT BREAKER RESET

After an automatic or accessory initiated trip or a manual push-to-trip operation, the circuit breaker is reset by moving the circuit breaker handle to the extreme OFF position.

Caution

- Lack of illumination of the status light does not indicate the terminals of the breaker are deenergized.

4. 310+ TRIP UNIT ADJUSTMENTS

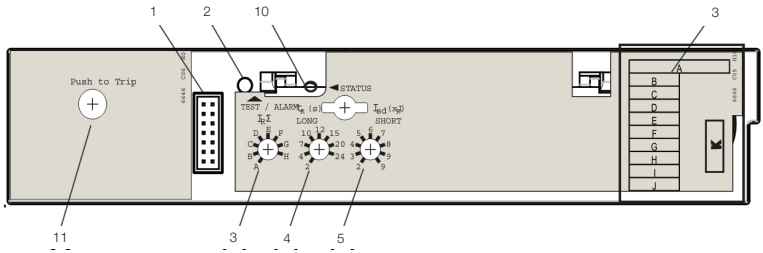


Figure 7

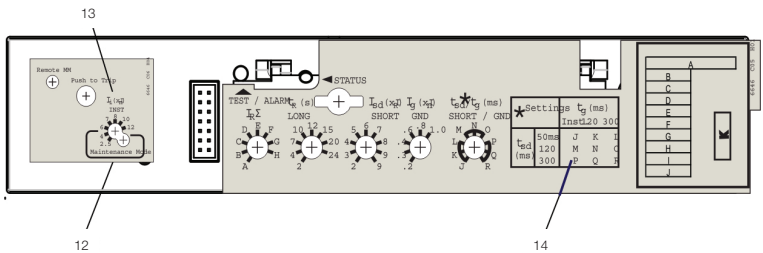


Figure 8

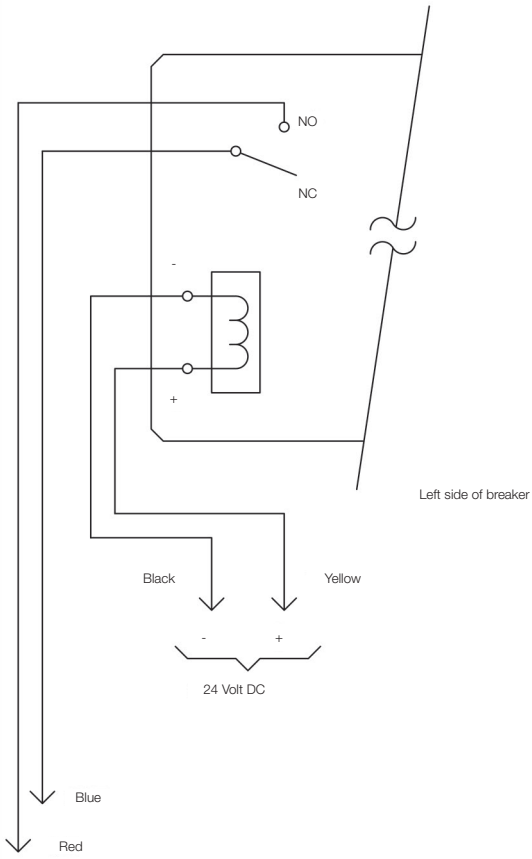


Figure 9

1. Test port: a test port is built into each trip unit to allow use of a functional test kit. The test kit performs a test of the long delay, short delay and ground fault functions.

2. Test LED: to be used with a no trip functional test. This LED is a dual function light. As previously stated, the LED is used as a no trip indicator when using the test port. In normal modes, this LED indicates a high load alarm. It will light if the continuous current is 95% of the setting and must be present for a 38 second duration.

3. IR - continuous current setting: in accordance with standards requirements, the trip unit initiates a trip of the circuit breaker within 2 hours for an overload of 135% and will trip as a function of 12 t for higher currents. Continuous current values for each lettered setting are indicated by the chart on the right side of the trip unit.

4. tR: the number of seconds required to trip @ 6x. For example, IR - 800 A, - 2 sec load current - 4800 A (6x). The breaker will trip in 2 seconds.

5. Isd: setting in multiples of IR. For short circuit conditions that exceed the short delay pick-up setting, the trip unit initiates a trip after a predetermined delay.

6. For the LSI style, the short delay time is a flat response determined by the tsd/tg switch setting of INST, 120 ms or 300 ms. For the LS style, the short delay time is an 12t function.

7. Status LED: a green status light indicates the operational status of the trip unit. If the load current is approximately 20% of the maximum current rating (In) of the breaker, the status light will blink on and off once each second.

8. Mechanical push-to-trip.

9. The maintenance mode and adjustable INSTantaneous features are only available on LSI styles. Please refer to the labeling to the left of the test kit connector. The maintenance mode consists of the two lowest settings of the INSTswitch: 2.5x and 4.0x. For example, a 1200 A (In) breaker with the switch set to 2.5x would trip instantaneously when the current exceeded 3000 A.

10. The adjustable INSTantaneous (Ii) Mode has four settings from 6x to 9x. For example, a 800 A (In) breaker with the (Ii) switch set to 7x would trip instantaneously with the current at or above 5600 A. The last setting on the (Ii) switch can be one of three values depending on the frame current: 800 A = 28, 1200 A = 12.

11. On an UBW1200 without maintenance mode, the lowest labeled SDT setting is labeled INSTaneous. The lowest SDT setting with Maintenance Mode is labeled as 50ms.

12. The Remote Maintenance Mode is enabled by applying 24 V dc to the two wire cable that exists the left side of the breaker. The wires are color coded as follows: Yellow = +24 V and Black = common ground. A blue colored LED, on the left side of the breaker is the maintenance mode section of the trip unit, will light. The lighted blue LED indicates that the lowest setting of the maintenance mode is enabled. This setting corresponds to 2.5x of In. Turning the adjustable switch on the trip unit has no affect on either the maintenance mode or the INST mode settings while the blue LED is lit. In addition to the blue colored LED, a relay contact (C, NO) is available. The wires for this contact exit the left hand side of the breaker and are color coded as follows: Blue = C, and Red = NO.

5. INSPECTION AND FIELD TESTING

5.1. INSPECTION

Circuit breaker should be inspected periodically. This inspection can be best done during normal equipment maintenance periods when no voltage to the equipment is available. The inspection should include the following checks 1 through 8.

Caution

- Voltages in energized equipment can cause severe personal injury or death before inspecting the circuit breaker in an electricalsystem, make sure the circuit breaker is switched to the off position and that there is no voltage present where work is to be performed. Special attention should be paid to reverse feed applications to ensure no voltage is present.
- Some commercial cleaning agents will dam age the nameplates or molded parts. Make sure that cleaning agents or solvents used to clean the circuit breaker are suitable for the job.

1. Remove dust, dirt, soil, grease, or moisture from the surface of the circuit breaker using a lint-free dry cloth, brush, or vacuum cleaner. Do not blow debris into the circuit breaker. If contamination is found, look for the source and eliminate the problem.
2. Switch circuit breaker to ON and OFF several times to be sure that the mechanical linkages are free and do not bind. If mechanical linkages are not free, replace circuit breaker.
3. With the circuit breaker in the ON position, press the PUSH-TO-TRIP button to mechanically trip the circuit breaker. Trip, reset, and switch circuit breaker ON several times. If mechanism does not reset each time the circuit breaker is tripped, replace the circuit breaker.
4. Check base, cover, and operation handle for cracks, chipping, and discoloration. Circuit breakers should be replaced if cracks or severe discoloration is found.
5. Check terminals and connectors for looseness or signs of overheating. Overheating will show as discoloration, melting, or blistering of conductor insulation, or as pitting or melting of conductor surface due to arcing. If there is no evidence of overheating or looseness, do not disturb or tighten the connections. If there is evidence of overheating, terminatons should be cleaned or replaced. Before re-energining the circuit breaker, all terminations and cable should be refurbished to the same condition as when originally installed.
6. Check circuit breaker mounting hardware, and tighten if necessary.
7. Check area where circuit breaker is installed for any safety hazards, including personal safety and fire hazards. Exposure to certain types of chemicals can cause deterioration of electrical connections.

NOTES

NOTES

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