

Residential Electrician

Task 6: Installing Breaker Boxes

VIDEO CLIP

Acknowledgement

The Alberta Construction Safety Association (ACSA) with the cooperation of member companies and their electrical contractors/workers, the Electrical Contractors Association of Alberta and Jason Shepherd Physical Therapy Inc. developed this electrical industry Physical Demands Analysis.

Disclaimer

The job tasks described in this report & related video footage may vary, please contact the company directly to confirm this job description is accurate.

Purpose of Task Analysis

Job demands information that can be utilized for assistance in selecting suitable job candidates, developing proactive injury prevention interventions and effective, sustainable disability management programs.

General Description

The electrician is responsible for the installation of breaker boxes and associated electrical components as per the building's electrical blueprints.

Work Organization

Journeyman and Apprentice Electrician numbers vary by worksite and company. Depending on the construction phase/type, an Electrician may be part of a crew performing this task for several days/weeks before rotating to another task.

Work Schedule

8+ hour shifts
Regular breaks spaced throughout workday: Usually two 15-minute coffee breaks and one 30-minute lunch break per shift

Essential Job Functions

- Installing breaker box panel
- Splicing wires (rough-in phase)
- Terminating wires (finishing phase)
- Clean-up (Sweeping, picking up waste materials)
- Materials handling

Assessment Criteria Used

Frequency Key		
FREQUENCY	% OF WORKDAY	HOURS OF 8-HOUR WORKDAY
Not required (N/R)	0%	0
Seldom (S)	0 - 5%	Not performed on a daily basis
Rare (R)	1 – 5%	< 29 min/day
Occasional (O)	6 - 33%	29 min to 2 hours 42 min per day or 1 rep/30 min
Frequent (F)	34 - 66%	2 hours 43 min to 5 hours 21 min per day or 1 rep/2 min
Constant (C)	67 – 100%	5 hours 22 min to 8 hours per day or 1 rep/30 sec

Equipment used to perform the job & frequency of use may include, but not limited to the following:

Frequent

- Tool belt
- Tools (wire cutters, pliers, knife, drills, screwdrivers, hammer)

Occasional

- Voltmeter
- Tape measure
- Flashlight
- Level

Rare

- Broom

Personal Protective Equipment Recommended

- ✓ Safety Glasses
- ✓ Hearing Protection
- ✓ Hard Hat
- ✓ Steel Toed Boots
- ✓ Gloves
- ✓ Overalls (Optional)

Environmental Conditions

Inside/Outside Work:

Inside 100%

Working Temperature:

Although temperatures may vary, both phases of the task may involve exposure to hot or cold weather conditions

Walking Surfaces:

Inside - Rough-in Phase: OSB/Plywood

- Finishing Phase: Concrete, hardwood, carpet

Outside - Mud, wood, snow, ice, grass (terrain may be uneven)

Dust:

Rough-in Phase: Mild

Finishing Phase: Paint fumes/Drywall dust – Mild/Moderate depending on proximity to Painters or Drywallers

Lighting:

Rough-in Phase/ Finishing Phase: Adequate, indoor lighting in most areas; dark spots in basement

Vapour/Fumes:

Rough-in Phase: Mild – Exhaust from portable generator

Finishing Phase: Mild-Moderate - Paint fumes

Noise Levels (measured with Audiometer):

Can exceed 100 dBA if portable generators, power tools or hammers are being utilized nearby

Vibration:

Mild – Drills, hammers

Moving Objects:

Mobile equipment, work trucks

Risks/Hazards:

Slips/Trips/Falls, skin punctures, muscle strains/soreness, pinch points, cuts/abrasions, electric shock

Size of Work Space:

Usually adequate, although the worker may have to maneuver into tight spots in order to complete task on the rare occasion

Sensory Requirements

The following are required to complete essential job functions and remain safe at all times:

Hearing (Conversation or Sounds)

Vision (Near/Far, Colour, and Depth)

Feeling (Tactile sensory discrimination)

Reading (English)

Speech/Comprehension (English)

Other Work Factors

Traveling:

Seldom – Leaving the work site for materials/supplies

Working Alone:

Worker may have to perform task at a work site without colleagues or other trades people on a rare basis

Working Independently / in Group:

Required to work independently for the majority of the shift, although he/she may be asked to assist a co-worker or request assistance for him-/herself when required

Work Pace (self or machine):

Self-Motivated – Moderate to Fast pace, depending on complexity

Interacting with Others:

Required to work with colleagues and other trades people

Operation of Mobile Equipment:

N/R

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FORCE LEVEL	WEIGHT HANDLED
Light	Less than 20 lbs.
Medium	20-49 lbs.
Heavy	50-99 lbs.
Very-Heavy	100+ lbs.

Critical Job Demands

MANUAL HANDLING	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Lift: Floor to Waist	Light force: Tools, breaker panel, box of circuit breakers			X			
Lift: Waist to Waist	Light force: Tools, breaker panel, box of circuit breakers			X			
Lift: Waist to Chest	Light force: Tools, breaker panel, box of circuit breakers				X		
Lift: Waist to Overhead	Light force: Electrical components, Tools				X		
Front carry	Light force: Tools, box of circuit breakers/electrical outlet components			X			
Right side carry	Light force: Tools, electrical components				X		
Left side carry	Light force: Tools, electrical components				X		
Static push	Light force: Installing electrical components				X		
Static pull	Light force: Terminating wires					X	
Dynamic push	Light force: Installing electrical components					X	
Dynamic pull	Light force: Terminating wires				X		

GRIP STRENGTH /COORDINATION	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Bilateral repetitive use of hands	Utilizing tools, terminating wires, installing breaker box components					X	
Repetitive use of dominant hand	Utilizing tools, terminating wires, installing breaker box components						X
Repetitive use of non-dominant hand	Utilizing tools, terminating wires, installing breaker box components				X		
Bilateral power grip	Light force: Tools, breaker panel, box of circuit breakers				X		
Power grip with dominant hand	Light force: Tool belt, tools, clean- up duties				X		
Power grip with non-dominant hand	Light force: Tool belt, tools, clean- up duties			X			
Bilateral fine dexterity skills	Terminating wires, handling electrical components					X	
Fine dexterity with dominant hand	Terminating wires, handling electrical components					X	
Fine dexterity with non-dominant hand	Terminating wires, handling electrical components					X	
Bilateral manual handling	Light force: Tools, breaker panel, box of circuit breakers				X		
Manual handling with dominant hand	Light force: Tools, breaker panel, box of circuit breakers				X		
Manual handling with non-dominant hand	Light force: Tools, breaker panel, box of circuit breakers			X			
Tool usage bilaterally	Light force: Sweeping			X			
Tool usage with dominant hand	Light force: Tools used for terminating wires						X
Tool usage with non-dominant hand	Light force: Tools used for terminating wires				X		

POSITIONAL/ MOBILITY	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Sitting	N/R	X					
Standing	Terminating wires, installing breaker box components (rough-in/finishing phases), clean-up duties					X	
Walking: Level surfaces	Terminating wires, installing breaker box components (rough-in/finishing phases), clean-up duties				X		
Rough surfaces	Construction debris			X			
Slopes	Work site terrain			X			
Climbing: Regular stairs	Accessing designated work areas				X		
Ladders	N/R	X					
Other climbing	N/R	X					
Jumping	N/R	X					
Running	N/R	X					
Balancing	N/R	X					
Static bending	Terminating wires, installing breaker box components (rough-in/finishing phases)					X	
Variable bending	Terminating wires, installing breaker box components (rough-in/finishing phases), clean-up duties				X		
Static twisting	Terminating wires, installing breaker box components (rough-in/finishing phases)				X		
Variable twisting	Terminating wires, installing breaker box components (rough-in/finishing phases), clean-up duties				X		
Kneeling	N/R	X					
Crouching	N/R	X					
Crawling	N/R	X					
Repetitive squatting	N/R	X					
Reaching: Above shoulder	Terminating wires, installing breaker box components (rough-in/finishing phases)				X		
Reaching: Below shoulder	Terminating wires, installing breaker box components				X		
Neck Postures/Movements	All neck positions required (180 ⁰ , up, down, side-to-side)						X
Throwing	N/R	X					
Foot Action	N/R	X					
Forceful/Jerky movements	N/R	X					

Psychosocial Demands

Seldom/Rare/Occasional/ Frequent/Constant

A. Understanding and memory:

Remember locations and routine procedures	Constant
Understand and remember short and simple instructions	Constant
Understand and remember detailed instructions	Constant

B. Sustained concentration and persistence:

Carry out short and simple instructions	Constant
Carry out detailed instructions	Constant
Maintain attention and concentration for extended periods	Constant
Perform activities within a schedule	Constant
Sustain an ordinary routine without supervision	Constant
Make simple decisions	Constant
Solve simple straightforward problems	Constant
Solve complex problems	Occasional

C. Social interaction:

Interact with the general public	Seldom
Ask questions or request assistance	Occasional
Accept instructions and feedback	Occasional
Get along well with others without distracting them	Constant
Get along well with others without being distracted by them	Constant

D. Adaptation:

Respond to changes in the environment or tasks	Constant
Aware of normal hazards and take appropriate precautions	Constant
Travel in unfamiliar places or use public transportation	Seldom
Set realistic goals or make plans independently of others	Occasional
Juggle tasks and prioritize	Occasional

Yes/No

E. Responsibility and accountability:

Is work place without the pressure of deadlines?	No
Does the work involve occasional pressure to meet deadlines?	Yes
Does the work involve significant pressures?	Yes

F. Language Requirements:

Is English required for safety purposes?	Yes
Is English required for professional purposes?	Yes

G. Educational Requirements:

Is grade 12 diploma required?	Yes
Is post-secondary required?	Yes
Is additional skill training required?	No

Injury Prevention Recommendations

1. Stretch regularly - used muscles throughout the shift – neck, shoulders, chest, elbows, forearms, wrists, hands, lower back, thighs and calves/ankles – paying particular attention to the postural muscles (low back and neck) to prevent risk of soft tissue injuries related to prolonged bending/twisting posture.
2. Warm-up exercises are recommended before undertaking manual handling tasks to reduce the chance of soft tissue injuries neck, back, upper and lower extremity
3. To help prevent low back strain/sprain from incorrect manual handling techniques – incorporate proper manual handling techniques at all times; utilize dolly, cart, hoist or forklift for all items over 50 lbs or of awkward shape whenever possible; maintain physical conditioning to a **Light** manual handling level
4. To help prevent lower extremity joint/muscle pain due to general deconditioning, poor cushioning in footwear and spending extended periods weightbearing on concrete surfaces – ensure proper fitting footwear with adequate cushioning and take regular stretch breaks hourly
5. When wearing a tool belt, it is recommended that workers utilize tool belts with shoulder straps/suspenders to better distribute/carry the weight
6. To prevent knee injuries, knee pads should be utilized when kneeling on hard &/or rough surfaces