



|                                                                                                                                                                                                                                   |                                                                                                                                                                               |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 说明书材质要求: <b>105g 有光铜版纸</b>                                                                                                                                                                                                        | 说明书成品尺寸: <b>105*143mm</b>                                                                                                                                                     |
| 第一: <b>专色用6级防晒油墨+CMYK油墨要求:</b><br>1. PANTONE137C专色油墨 ( <b>专色用6级防晒油墨</b> ):<br>如果自己配色, 油墨配比为: 酒联中黄 ( <b>防晒</b> ) 2000g<br>酒联金红 ( <b>防晒</b> ) 225g<br>2. C色油墨: 酒联天蓝墨<br>3. M色油墨: 酒联金红墨<br>4. Y色油墨: pantone123C专色油墨<br>5. K色油墨: 酒联黑墨 | 第二: 特别注意:<br>1. 印刷时看样请参考我司提供的实物样品颜色。不得偏色<br>2. 137C的专色 <b>不得</b> 参考C=0, M=35, Y=90, K=0对应的四色<br>色谱颜色来看样印刷<br><div><div></div> Pantone 137C<br/><div></div> Black (两色印刷)</div> |
| 折叠方式: <b>风琴折</b> ( <small>20P以下<br/>角风等折</small> )                                                                                                                                                                                | 备注:                                                                                                                                                                           |

**特别注意: 此页内容不印刷**

风琴折 + 对折 页面顺序

16P 页面顺序

|    |    |    |    |
|----|----|----|----|
| 9  | 10 | 11 | 封面 |
| 12 | 13 | 14 | 封底 |

|   |   |   |   |
|---|---|---|---|
| 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 |

20P 页面顺序

|    |    |    |    |    |
|----|----|----|----|----|
| 11 | 12 | 13 | 14 | 封面 |
| 15 | 16 | 17 | 18 | 封底 |

|   |   |   |   |    |
|---|---|---|---|----|
| 1 | 2 | 3 | 4 | 5  |
| 6 | 7 | 8 | 9 | 10 |

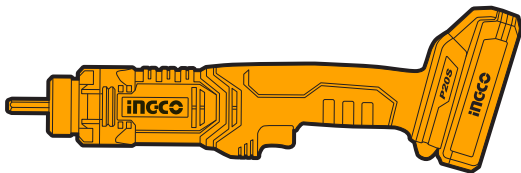
|                  |          |           |     |                                        |            |     |                   |            |     |
|------------------|----------|-----------|-----|----------------------------------------|------------|-----|-------------------|------------|-----|
| 更<br>改<br>记<br>录 | 1.更新电池包  |           |     | 1.更新品名<br>2.更新大类文案和排版细节<br>3.封底增加三合一标记 |            |     | 1. 删除三合一标记, 版本号不变 |            |     |
|                  | 0225.V05 | 2025.2.10 | CXY | 1024.V04                               | 2024.10.11 | GWY | 1024.V04          | 2024.10.19 | CXY |
|                  | 版本号      | 日期        | 设计师 | 版本号                                    | 日期         | 设计师 | 版本号               | 日期         | 设计师 |

# INGCO

[www.ingco.com](http://www.ingco.com)

## PRODUCT MANUAL

## CORDLESS CONCRETE VIBRATOR



**CCVLI202301 CCVLI202301xy**  
**UCCVLI202301 UCCVLI202301xy**  
**x(blank,1,2,3,4,5,6,7,8,9,E,S,A,M)**  
**y(blank,-1,-2,-3,-4,-5,-6,-7,-8,-9,E,S,A,M)**



**GENERAL POWER TOOL SAFETY WARNINGS**

**⚠ WARNING!** Read all safety warnings, instructions, illustrations and specifications provided with this power tool. *Failure to follow all instructions listed below may result in electric shock, fire and/or serious injury.*

**Save all warnings and instructions for future reference.**

*The term "power tool" in the warnings refers to your mains-operated (corded) power tool or battery-operated (cordless) power tool.*

**1) Work area safety**

- a) **Keep work area clean and well lit.** *Cluttered or dark areas invite accidents.*
- b) **Do not operate power tools in explosive atmospheres, such as in the presence of flammable liquids, gases or dust.** *Power tools create sparks which may ignite the dust or fumes.*
- c) **Keep children and bystanders away while operating a power tool.** *Distractions can cause you to lose control.*

**2) Electrical safety**

- a) **Power tool plugs must match the outlet. Never modify the plug in any way.** **Do not use any adapter plugs with earthed (grounded) power tools.** *Unmodified plugs and matching outlets will reduce risk of electric shock.*
- b) **Avoid body contact with earthed or grounded surfaces, such as pipes, radiators, ranges and refrigerators.** *There is an increased risk of electric shock if your body is earthed or grounded.*
- c) **Do not expose power tools to rain or wet conditions.** *Water entering a power tool will increase the risk of electric shock.*
- d) **Do not abuse the cord. Never use the cord for carrying, pulling or unplugging the power tool. Keep cord away from heat, oil, sharp edges or moving parts.** *Damaged or entangled cords increase the risk of electric shock.*
- e) **When operating a power tool outdoors, use an extension cord suitable for outdoor use.** *Use of a cord suitable for outdoor use reduces the risk of electric shock.*
- f) **If operating a power tool in a damp location is unavoidable, use a residual current device (RCD) protected supply.** *Use of an RCD reduces the risk of electric shock.*

### 3) Personal safety

- a) **Stay alert, watch what you are doing and use common sense when operating a power tool. Do not use a power tool while you are tired or under the influence of drugs, alcohol or medication.** *A moment of inattention while operating power tools may result in serious personal injury.*
- b) **Use personal protective equipment. Always wear eye protection.** *Protective equipment such as a dust mask, non-skid safety shoes, hard hat or hearing protection used for appropriate conditions will reduce personal injuries.*
- c) **Prevent unintentional starting. Ensure the switch is in the off-position before connecting to power source and/or battery pack, picking up or carrying the tool.** *Carrying power tools with your finger on the switch or energising power tools that have the switch on invites accidents.*
- d) **Remove any adjusting key or wrench before turning the power tool on.** *A wrench or a key left attached to a rotating part of the power tool may result in personal injury.*
- e) **Do not overreach. Keep proper footing and balance at all times.** *This enables better control of the power tool in unexpected situations.*
- f) **Dress properly. Do not wear loose clothing or jewellery. Keep your hair and clothing away from moving parts.** *Loose clothes, jewellery or long hair can be caught in moving parts.*
- g) **If devices are provided for the connection of dust extraction and collection facilities, ensure these are connected and properly used.** *Use of dust collection can reduce dust-related hazards.*
- h) **Do not let familiarity gained from frequent use of tools allow you to become complacent and ignore tool safety principles.** *A careless action can cause severe injury within a fraction of a second.*

### 4) Power tool use and care

- a) **Do not force the power tool. Use the correct power tool for your application.** *The correct power tool will do the job better and safer at the rate for which it was designed.*
- b) **Do not use the power tool if the switch does not turn it on and off.** *Any power tool that cannot be controlled with the switch is dangerous and must be repaired.*
- c) **Disconnect the plug from the power source and/or remove the battery**

pack, if detachable, from the power tool before making any adjustments, changing accessories, or storing power tools. *Such preventive safety measures reduce the risk of starting the power tool accidentally.*

- d) **Store idle power tools out of the reach of children and do not allow persons unfamiliar with the power tool or these instructions to operate the power tool.** *Power tools are dangerous in the hands of untrained users.*
- e) **Maintain power tools and accessories. Check for misalignment or binding of moving parts, breakage of parts and any other condition that may affect the power tool's operation. If damaged, have the power tool repaired before use.** *Many accidents are caused by poorly maintained power tools.*
- f) **Keep cutting tools sharp and clean.** *Properly maintained cutting tools with sharp cutting edges are less likely to bind and are easier to control.*
- g) **Use the power tool, accessories and tool bits etc. in accordance with these instructions, taking into account the working conditions and the work to be performed.** *Use of the power tool for operations different from those intended could result in a hazardous situation.*
- h) **Keep handles and grasping surfaces dry, clean and free from oil and grease.** *Slippery handles and grasping surfaces do not allow for safe handling and control of the tool in unexpected situations.*

## 5) Battery tool use and care

- a) **Recharge only with the charger specified by the manufacturer.** *A charger that is suitable for one type of battery pack may create a risk of fire when used with another battery pack.*
- b) **Use power tools only with specifically designated battery packs.** *Use of any other battery packs may create a risk of injury and fire.*
- c) **When battery pack is not in use, keep it away from other metal objects, like paper clips, coins, keys, nails, screws or other small metal objects, that can make a connection from one terminal to another.** *Shorting the battery terminals together may cause burns or a fire.*
- d) **Under abusive conditions, liquid may be ejected from the battery; avoid contact. If contact accidentally occurs, flush with water. If liquid contacts eyes, additionally seek medical help.** *Liquid ejected from the battery may cause irritation or burns.*

- e) **Do not use a battery pack or tool that is damaged or modified.** *Damaged or modified batteries may exhibit unpredictable behaviour resulting in fire, explosion or risk of injury.*
- f) **Do not expose a battery pack or tool to fire or excessive temperature.** *Exposure to fire or temperature above 130 °C may cause explosion.*
- g) **Follow all charging instructions and do not charge the battery pack or tool outside the temperature range specified in the instructions.** *Charging improperly or at temperatures outside the specified range may damage the battery and increase the risk of fire.*

## **6) Service**

- a) **Have your power tool serviced by a qualified repair person using only identical replacement parts.** *This will ensure that the safety of the power tool is maintained.*
- b) **Never service damaged battery packs.** *Service of battery packs should only be performed by the manufacturer or authorized service providers*

## BATTERY TOOL SAFETY WARNINGS

Save these instructions.

### **⚠ CAUTION!**

**Only use genuine original batteries.** *Use of non-genuine batteries, or batteries that have been altered, may result in the battery bursting causing fires, personal injury, and damage. It will also void the warranty for the tool and charged and dark areas invite accidents.*

### **⚠ WARNING!**

- a) **Do not dismantle, open or shred secondary cells or batteries.**
- b) **Keep batteries out of the reach of children.** *Battery usage by children should be supervised. Especially keep small batteries out of reach of small children.*
- c) **Seek medical advice immediately if a cell or a battery has been swallowed.**
- d) **Do not expose cells or batteries to heat or fire.** *Avoid storage in direct sunlight.*
- e) **Do not short-circuit a cell or a battery.** *Do not store cells or batteries haphazardly in a box or drawer where they may short-circuit each other or be short-circuited by other metal objects.*
- f) **Do not remove a cell or battery from its original packaging until required for use.**
- g) **Do not subject cells or batteries to mechanical shock.**
- h) **In the event of a cell leaking, do not allow the liquid to come in contact with the skin or eyes.** *If contact has been made, wash the affected area with copious amounts of water and seek medical advice.*
- i) **Do not use any charger other than that specifically provided for use with the equipment.**
- j) **Observe the plus (+) and minus (-) marks on the cell, battery and equipment and ensure correct use.**
- k) **Do not use any cell or battery which is not designed for use with the equipment.**
- l) **Do not mix cells of different manufacture, capacity, size or type within a device.**
- m) **Always purchase the battery recommended by the device manufacturer for the equipment.**
- n) **Keep cells and batteries clean and dry.**
- o) **Wipe the cell or battery terminals with a clean dry cloth if they become**

**dirty.**

- p) **Secondary cells and batteries need to be charged before use.** *Always use the correct charger and refer to the manufacturer's instructions or equipment manual for proper charging instructions.*
- q) **Do not leave a battery on prolonged charge when not in use.**
- r) **After extended periods of storage, it may be necessary to charge and discharge the cells or batteries times to obtain maximum performance.**
- s) **Retain the original product literature for future reference.**
- t) **Use the cell or battery only in the application for which it was intended.**
- u) **When possible, remove the battery from the equipment when not in use.**
- v) **Dispose of properly.**

#### **Tips for maintaining maximum battery life**

- a) **Charge the battery cartridge before completely discharged.** *Always stop tool operation and charge the battery cartridge when you notice less tool power.*
- b) **Never recharge a fully charged battery cartridge.** *Overcharging shortens the battery service life.*
- c) **Charge the battery cartridge with room temperature at 10°C-40°C (50°F-104°F).** *Let a hot battery cartridge cool down before charging it.*
- d) **Charge the battery cartridge if you do not use it for a long period (more than six months).**

#### **Important safety instructions for battery cartridge**

- a) **Before using battery cartridge, read all instructions and cautionary markings on battery charger, battery, and) product using battery.**
- b) **Do not disassemble battery cartridge.**
- c) **If operating time has become excessively shorter, stop operating immediately.** *It may result in a risk of overheating, possible burns and even an explosion.*
- d) **If electrolyte gets into your eyes, rinse them out with clear water and seek medical attention right away.** *It may result in loss of your eyesight.*
- e) **Do not short the battery cartridge:**
  - *Do not touch the terminals with any conductive material.*
  - *Avoid storing battery cartridge in a container with other metal objects such as nails, coins, etc.*

- *Do not expose battery cartridge to water or rain.*
  - *A battery short can cause a large current flow, overheating, possible burns and even a breakdown.*
- f) **Do not store the tool and battery cartridge in locations where the temperature may reach or exceed 50°C (122°F).**
  - g) **Do not incinerate the battery cartridge even if it is severely damaged or is completely worn out. The battery cartridge can explode in a fire.**
  - h) **Be careful not to drop or strike battery.**
  - i) **Do not use a damaged battery.**
  - j) **Follow your local regulations relating to disposal of battery.**

### **Tool / battery protection system**

The tool is equipped with a tool/battery protection system. This system automatically cuts off power to the motor to extend tool and battery life. The tool will automatically stop during operation if the tool or battery is placed under one of the following conditions:

#### **Overload protection**

When the battery is operated in a manner that causes it to draw an abnormally high current, the tool automatically stops without any indication. In this situation, turn the tool off and stop the application that caused the tool to become overloaded. Then turn the tool on to restart.

#### **Overheat protection**

When the tool/battery is overheated, the tool stops automatically. In this situation, let the tool/battery cool before turning the tool on again.

### **Transportation**

Batteries comply with all applicable shipping regulations as prescribed by industry and legal standards (for more information, check with the manufacturer).

Transporting batteries can possibly cause fire if the battery terminals inadvertently come in contact with conductive materials. When transporting batteries, make sure that the battery terminals are protected and well insulated from materials that could contact them and cause a short circuit.

The information provided in this section of the manual is provided in good faith and believed to be accurate at the time the document was created. However, no warranty, expressed or implied, is given. It is the buyer's responsibility to ensure

that its activities comply with the applicable regulations.

### **Protecting the environment**

Separate collection. This product must not be disposed of with normal household waste.

Should you find one day that your product needs replacement, or if it is of no further use to you, do not dispose of it with household waste. Make this product available for separate collection.

Separate collection of used products and packaging allows materials to be recycled and used again. Re-use of recycled materials helps prevent environmental pollution and reduces the demand for raw materials.

Local regulations may provide for separate collection of electrical products from the household, at municipal waste sites or by the retailer when you purchase a new product.

### **Rechargeable battery pack**

This long-life battery pack must be recharged when it fails to produce sufficient power on jobs which were easily done before. At the end of its technical life, discard it with due care for our environment:

- Run the battery pack down completely, then remove it from the tool.
- Lithium-ion cells are recyclable. Take them to your dealer or a local recycling station. The collected battery packs will be recycled or disposed of properly.

## THE SYMBOLS IN INSTRUCTION MANUAL

|                                                                                     |                                                                                                                                                                                       |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | Double insulated for additional protection                                                                                                                                            |
|    | Read the instruction manual before using.                                                                                                                                             |
|    | CE conformity.                                                                                                                                                                        |
|    | Safety alert.<br>Please only use the accessories supported by the manufacturer.                                                                                                       |
|    | Wear safety glasses, hearing protection and dust mask.                                                                                                                                |
|    | Waste electrical products should not be disposed of with household waste.<br>Please recycle where facilities exist. Check with your Local Authority or retailer for recycling advice. |
|    | Charging the battery only below 40°C                                                                                                                                                  |
|   | Always recycle batteries.                                                                                                                                                             |
|  | Do not destroy battery by fire.                                                                                                                                                       |
|  | Do not expose battery to water                                                                                                                                                        |

**ADDITIONAL SAFETY WARNING**

- a) Always keep your hands and face away from vibrating head when operating.
- b) Switch off the tool immediately if you notice abnormal noise or something faulty during operation.
- c) Inspect the tool carefully for breakage, cracks or deformation if you accidentally drop it or strike it against something.
- d) Do not carry the tool with finger on switch.
- e) Do not set the tool down and switch it on. The vibrating head may whip around out of control and cause an accident.
- f) Be careful not to allow water, wet concrete or the like to get into the tool. Do not let the tool fall into wet concrete.
- g) Insert the vibrating head carefully between iron/steel frames or reinforcing rods not to come in contact with them.
- h) Do not crush or twist the flexible hose.
- i) Do not overly bend the flexible hose.
- j) Use a wet cloth or the like to carefully wipe off any wet concrete left on the tool after use. Extra care should be given to thorough cleaning of the vents, switch area, cover openings, etc.
- k) Do not use the tool in the rain. Do not clean the tool in water.
- l) Some material contains chemicals which may be toxic. Take caution to prevent dust inhalation and skin contact. Follow material supplier safety data.

## RESIDUAL RISKS

Even when the power tool is used as prescribed it is not possible to eliminate all residual risk factors. The following hazards may arise in connection with the power tool's construction and design:

- a) Health defects resulting from vibration emission if the power tool is being used over longer period of time or not adequately managed and properly maintained.
- b) Injuries and damage to property to due to broken accessories that are suddenly dashed.

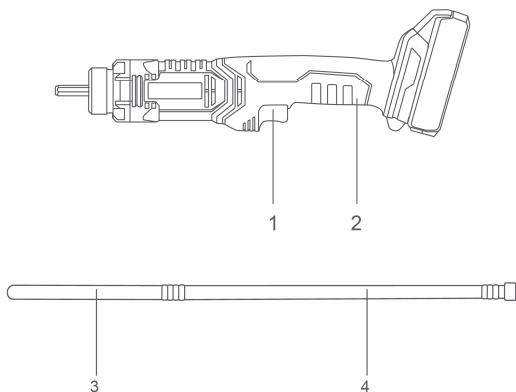
### **WARNING!**

**This power tool produces an electromagnetic field during operation. This field may under some circumstances interfere with active or passive medical implants. To reduce the risk of serious or fatal injury, we recommend persons with medical implants to consult their physician and the medical implant manufacturer before operating this power tool.**

## INTENDED USE

The tool is intended for removing bubbles from concrete when casting concrete.

## SPECIFICATIONS



### Components

- |            |                   |
|------------|-------------------|
| 1. Trigger | 3. Head           |
| 2. Handle  | 4. Flexible shaft |

### Symbols

The followings show the symbols used for tool.

|                  |                                         |
|------------------|-----------------------------------------|
| V                | Volts                                   |
| ---              | Direct Current                          |
| .../min<br>r/min | revolutions or reciprocation per minute |

## Technical specifications

| Model No.        | CCVLI202301<br>CCVLI202301xy | UCCVLI202301<br>UCCVLI202301xy |
|------------------|------------------------------|--------------------------------|
| Voltage          | 20V                          | 20V                            |
| Non-load current | 2.5A                         | 2.5A                           |
| Load current     | 8-10A                        | 8-10A                          |
| No-load speed    | 0-2300/min                   | 0-2300/min                     |

**Model No. NOTE:** x (blank, 1,2,3,4,5,6,7,8,9,E,S,A,M); y (blank, -1,-2,-3,-4,-5,-6,-7,-8,-9,E,S,A,M)

- Due to our continuing program of research and development, the specifications herein are subject to change without notice.
- Specifications and battery cartridge may differ from country to country.

|                 |                                                            |                                                             |
|-----------------|------------------------------------------------------------|-------------------------------------------------------------|
| Nosie level     | L <sub>pA</sub> : 89.58 dB(A)<br>K <sub>pA</sub> : 3 dB(A) | L <sub>WA</sub> : 100.58 dB(A)<br>K <sub>WA</sub> : 3 dB(A) |
| Vibration level | Work mode                                                  |                                                             |
| Rear handle     | ah =2.936 m/s <sup>2</sup>                                 |                                                             |
| Front handle    | ah =2.601 m/s <sup>2</sup>                                 | K=1.5m/s                                                    |

**⚠ WARNING!**

Only use original battery pack and battery charger as below for this power tool:

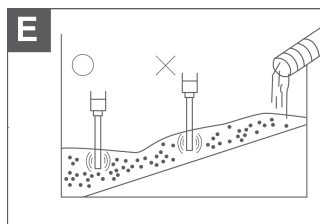
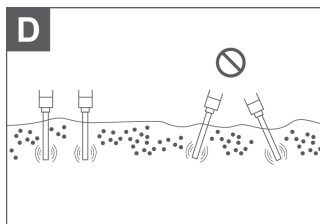
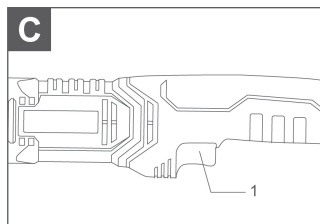
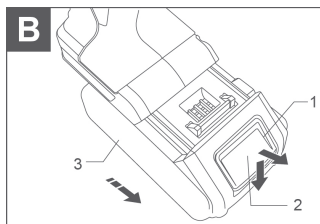
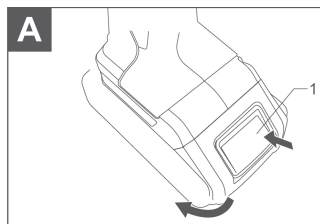
| Product                | Battery pack |                     |                |
|------------------------|--------------|---------------------|----------------|
| Model No.              | Type         | Rated voltage       | Rated capacity |
| FBLI2001<br>FBLI2001xy | Lithium-Ion  | 18.5V d.c., 20V Max | 2.0Ah          |
| FBLI2002<br>FBLI2002xy |              |                     | 4.0Ah          |
| FBLI2003<br>FBLI2003xy |              |                     | 5.0Ah          |

**Model No. NOTE:** x (blank, 1,2,3,4,5,6,7,8,9,E,S,A,M); y (blank, -1,-2,-3,-4,-5,-6,-7,-8,-9,E,S,A,M)

| Product                                                | Battery pack charger |                      |                      |                      |
|--------------------------------------------------------|----------------------|----------------------|----------------------|----------------------|
| Model No.                                              | Input power          | Input voltage        | Output rated voltage | Output rated current |
| FCLI2001<br>FCLI2001xy                                 | 50W                  | 220-240V<br>~50/60Hz | 20V d.c.             | 2A                   |
| UFCLI2001<br>UFCLI2001xy                               |                      | 110-120V<br>~50/60Hz |                      |                      |
| FCLI20411<br>FCLI20411xy<br>FCLI2034<br>FCLI2034xy     | 105W                 | 220-240V<br>~50/60Hz | 21V d.c.             | 4A                   |
| UFCLI20411<br>UFCLI20411xy<br>UFCLI2034<br>UFCLI2034xy |                      | 110-120V<br>~50/60Hz |                      |                      |

**Model No. NOTE:** x (blank, 1,2,3,4,5,6,7,8,9,E,S,A,M); y (blank, -1,-2,-3,-4,-5,-6,-7,-8,-9,E,S,A,M)

# OPERATION PICTURE



## FUNCTIONAL DESCRIPTION

### CAUTION!

- Always be sure that the tool is switched off and the battery cartridge is removed before adjusting or checking function on the tool.
- Installing or removing battery cartridge.

### Figure A

1. Recessed part in the battery cartridge cover

### Figure B

1. Black part 2. Button 3. Battery cartridge

Always switch off the tool before insertion or removal of the battery cartridge.

To remove the battery cartridge, first open the battery cartridge cover. To open the cover, press its recessed part and pivot it with the recessed part depressed. And then withdraw it from the tool while sliding the button on the front of the cartridge.

To insert the battery cartridge, align the tongue on the battery cartridge with the groove in the housing and slip it into place. Always insert it all the way until it locks in place with a little click. If you can see the red part on the upper side of the button, it is not locked completely. Insert it fully until the red part cannot be seen. If not, it may accidentally fall out of the tool, causing injury to you or someone around you.

Do not use force when inserting the battery cartridge. If the cartridge does not slide in easily, it is not being inserted correctly.

## Switch action

### Figure C

1. Switch lever

### CAUTION!

- Before inserting the battery cartridge into the tool, always check to see that the switch lever actuates properly and returns to the "OFF" position when released.
- To start the tool, simply pull the switch lever. Release the switch lever to stop.
- Switch lever can be pulled from either top or back side of the tool.

## OPERATION

Hold the tool straight when inserting/operating. Use the tool within the effective vibrations range at equidistant intervals. The effective air bubble removal range is about ten times diameter of the vibrating head, or around 250 mm (9-27/32").

Do not use this tool to move concrete within a form. The mortar will just move away and the coarse aggregate will remain, causing segregation.

### Figure D

Effective leveling and removal of air bubbles Removal of the air bubbles is complete after you have worked the tool throughout each effective range, the concrete stops shrinking, and the mortar has risen evenly to the surface, giving off a light appearance. Gently remove the operating tool not to leave holes.

### NOTE:

Vibrating too long in a single place causes concrete segregation.

When the coarse aggregates segregates when placing concrete, shovel out the coarse aggregate and put it where there is plenty of mortar. Then use the tool on it. Don't leave coarse aggregate in the segregated condition.

### Figure E

When concreting a slope site, always pour from the bottom at the beginning. This way the weight of the freshly poured concrete and vibration will lead to effective removal of air bubbles. Conversely, if the pouring is done first from above, the mortar will separate and eventually slide to the bottom.

## MAINTENANCE&MALFUNCTIONS

### Possible malfunctions and methods of their eliminations

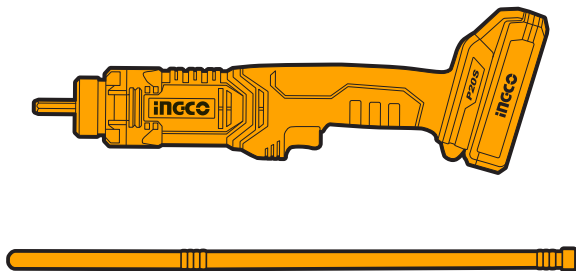
| <b>Malfunction</b>                                                                            | <b>Probable causes</b>                                                                                                                                                                                                           | <b>Actions</b>                                                                                                         |
|-----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| When the machine is turned on, the electric motor does not work.                              | <ul style="list-style-type: none"> <li>● Switch failure</li> <li>● The power cord or wiring is broken, power cord plug malfunction;</li> <li>● No brush contact with the collector;</li> <li>● Wear/damage of brushes</li> </ul> | Disconnect the machine from the mains and contact a qualified specialist.                                              |
| Formation of a circular fire on the collector                                                 | <ul style="list-style-type: none"> <li>● Brush wear/damage of the brush holder;</li> <li>● Malfunction in the armature coil</li> </ul>                                                                                           | Disconnect the machine from the mains and contact a qualified specialist. Please don't repair the machine by your own. |
| When working, smoke or the smell of burning insulation appears from the ventilation openings. | <ul style="list-style-type: none"> <li>● Malfunction in the electric motor coil;</li> <li>● Malfunction of the electrical part of the tool.</li> </ul>                                                                           |                                                                                                                        |
| Increased noise in the gearbox                                                                | <ul style="list-style-type: none"> <li>● Wear/breakage of gears or bearings</li> </ul>                                                                                                                                           |                                                                                                                        |
| When the machine is turned on, the spindle does not rotate                                    | <ul style="list-style-type: none"> <li>● Gearbox failure.</li> </ul>                                                                                                                                                             |                                                                                                                        |

### Critical state criteria

| <b>Critical state criteria</b>                                                         | <b>Probable causes</b>       | <b>Actions</b>                                                                                                         |
|----------------------------------------------------------------------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Cracks on the surfaces of bearing and housing parts                                    | Fatigue deformation of metal | Disconnect the machine from the mains and contact a qualified specialist. Please don't repair the machine by your own. |
| The power cord or plug is damaged                                                      | Overload or breakage         |                                                                                                                        |
| Excessive wear or damage to the motor or reductor mechanism, or a combination of signs | Fatigue deformation of metal |                                                                                                                        |

### Critical state criteria

| <b>List of critical failures</b>                                                                                                    | <b>Actions</b>                                    |
|-------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Electric motor sparking                                                                                                             | It is necessary to contact a qualified specialist |
| The appearance of extraneous noise                                                                                                  | It is necessary to contact a qualified specialist |
| If the above malfunctions are detected, it is necessary to disconnect the machine from the mains and contact a qualified specialist |                                                   |



MADE IN CHINA 0225.V05

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