



Descriptive Report and Test Results

MASTER CONTRACT: 215310

REPORT: 70126797

PROJECT: 70126797

Edition 1: September 12, 2017; Project 70126797 - Taiwan
Issued by Jessie Lin

Contents: Certificate of Compliance - Pages 1 to 2
Supplement to Certificate of Compliance - Page 1
Description and Tests - Pages 1 to 30
Att1 Figure – Page 1 to 14
Att2 Drawing – Page 1 to 6
Att3 Manual 1

PRODUCTS

CLASS 3881 51 - TOOLS - Portable

CLASS 3881 81 - TOOLS - Portable - Certified to US Standards

Model	Description	V	Hz	A	n ₀ /min
MD300N	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
TB30X	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
CM/800/1	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
CM/800/3	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
HF-30A	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
SB35	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
MAGPRO 35 SEMI AUTOMATIC	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
MB300 AUTO	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
MD300A	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
MD35A	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550

This report shall not be reproduced, except in full, without the approval of CSA Group.

5F, No. 12, Wenhua St, Neihu District, Taipei City 114, Taiwan
Telephone: (886)2.2798.7123 Fax: (886)2.2798.7125 www.csagroup.org

APPLICABLE REQUIREMENTS

- CAN/CSA-C22.2 No. 745-2-31-95
(ANSI/UL 745-2-31, 1st Edition) used in conjunction with:
 - Safety of Portable Electric Tools - Part 2: Particular Requirements for Diamond Core Drills
- CAN/CSA-C22.2 No. 60745-1-07 Upd1+Upd2+Upd3
(ANSI/UL 60745-1, 4th Edition)
 - Hand-held motor-operated electric tools- Part 1: General Requirements

MARKINGS

The manufacturer is required to apply the following markings:

- Products shall be marked with the markings specified by the particular product standard.
- Products certified for Canada shall have all Caution and Warning markings in both English and French.

Additional bilingual markings not covered by the product standard(s) may be required by the Authorities Having Jurisdiction. It is the responsibility of the manufacturer to provide and apply these additional markings, where applicable, in accordance with the requirements of those authorities.

The products listed are eligible to bear the CSA Mark shown with adjacent indicators 'C' and 'US' for Canada and US (indicating that products have been manufactured to the requirements of both Canadian and U.S. Standards) or with adjacent indicator 'US' for US only or without either indicator for Canada only.

The following markings appear on each unit via a CSA certified and UL recognized adhesive type nameplate(s) suitable for the surface to be applied, unless otherwise stated.

- CSA Mark with "C/US" indicator adjacent to CSA Mark;
- Submitter's identification; and/or contract number "215310";
- Model designation;
- Complete electrical rating in Volts, Hz, Amperes;
- Symbol for nature of supply, unless the rated frequency is marked;
- Rated no-load speed of the output spindle;
- Date of manufacture or equivalent;
- "WARNING - To reduce the risk of injury, user must read and understand instruction manual. Do not expose to rain or use in damp locations."

The word "WARNING" shall be in capital letters not less than 2.4 mm high, and shall not be separated from the cautionary statement.

Nameplate adhesive label material approval information:

1. Yong Mei Printing Company, Limited (INT) CSA Certified. File no. 87277, UL Certified. File no. MH17252.

Model	Application Surface	Max Temp (°C)
YM-50	Metal and plastic groups III and VI	80
YM-S	Metal and plastic groups III and VI	80

Instruction Manual

An instruction manual and safety instructions shall be provided with the tool and packaged in such a way that it is noticed by the user when the tool is removed from the packaging. The safety instructions may be separate from the instruction manual. An explanation of the symbols required by the standard shall be provided in either the instruction manual or the safety instructions. They shall be written in the official language(s) of the country in which the tool is sold.

They shall be legible and contrast with the background.

They shall include the name and address of the manufacturer or supplier or any other agent responsible for placing the tool on the market.

The General Power Tool Safety Warnings and the specific tool Safety Warnings, if in English, shall be verbatim and in any other official language to be equivalent.

Format of all Safety Warnings must differentiate, by font highlighting or similar means, the context of clauses as illustrated below.

All notes in the safety instructions are not to be printed, they are information for the designer of the manual.

General Power Tool Safety Warnings

⚠ **WARNING** Read all safety warnings and instructions. Failure to follow the warnings and instructions 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.

NOTE The term “residual current device (RCD)” may be replaced by the term “ground fault circuit interrupter (GFCI)” or “earth leakage current breaker (ELCB)”.

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 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, clothing and gloves 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.

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 the battery pack from the power tool before making and 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. 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.

5) 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.

ALTERATIONS

- (a) Markings as noted above.
- (b) Change switch type
- (c) Add instruction in manual

WARNING: While operating, only hold the crank handles, not any other part of the machine. Placing the hand on the machine may result in an electric shock in the event of a voltage leak or if the machine cuts its own power supply cable

FACTORY TESTS

Correct Operation Test

The safe operation shall be checked, for example, by electrical measurements, by verifying the functional devices, such as switches and manually-operated controls, and by verifying the direction of rotation of motors.

Electric Strength Test:

The insulation of the tools shall be checked by the following tests:

A voltage of substantially sine-wave form, having a frequency of 50 Hz or 60 Hz and the value shown in Table 1, is immediately applied, for 3 s, between live parts and:

- a) accessible metal parts which may become live in the event of an insulation fault or as a result of incorrect assembly;
- b) inaccessible metal parts.

The tests of item a) are made on the assembled tool; the test of item b) is made on the tool, either completely assembled, or in the production line.

The tests of item a) are made on all tools, the tests of item b) being only made on class II tools.

The high-voltage transformer used for the tests shall be so designed that, when the output terminals are short-circuited after the output voltage has been adjusted to the appropriate test voltage, the output current is at least 200 mA.

The overcurrent relay shall trip when the output current exceeds 5 mA.

Care shall be taken that the r.m.s. value of the test voltage applied is measured within $\pm 3\%$ and that the voltage measuring device or other indicator responds to the output voltage of the transformer.

Attention is drawn to the fact that the test described cannot always be used if the tool incorporates d.c. components; in such cases, tests with d.c. may be necessary.

The inherent resistance of the d.c. source shall allow a short-circuit current of at least 200 mA.

No flashover or breakdown shall occur during the tests.

Table 1 - Test voltages for the electric strength test

Application of test voltage	Test voltage V		
	Class III tools	Class II tools	Class I tools
Over basic insulation	400	1000	1000
Over double insulation or reinforced insulation	-	2500	-

WARNING: The factory test(s) specified may present a hazard of injury to personnel and/or property and should only be performed by persons knowledgeable of such hazards and under conditions designed to minimize the possibility of injury.

N.4 Earthing continuity test

For class I tools, a current of at least 10 A, derived from an a.c. source having a no-load voltage not exceeding 12 V, is passed between the earthing terminal or the earthing contact and, in turn, each of the accessible metal parts which need to be earthed for safety reasons.

The voltage drop between the earthing contact of the plug or the external end of an earth continuity conductor or of the appliance inlet and the accessible metal part is measured, and the resistance calculated from the current and this voltage drop.

In no case shall the resistance exceed 0,3 Ω. This value is applicable to supply cable lengths up to 5 m. In case of supply cables having a length exceeding 5 m, it is increased by 0,12 Ω for any further length of 5 m.

Care shall be taken that the contact resistance between the tip of the measuring probe and the metal parts under test does not influence the test results.

SPECIAL INSTRUCTIONS FOR FIELD SERVICES

- Component descriptions marked with either the "(INT)" or "(INT*)" identifiers may be substituted with other components providing the requirements specified under the notes in the "Description" are complied with.

COMPONENT SPECIAL PICKUP

- Component descriptions marked with the identifier "(CT)" are subject to annual pickup and Conformity Testing.

DESCRIPTION

Notes:

1. Component Substitution
 - a) Critical components (those identified by mfr name, cat no), which are NOT identified with either "INT" or "INT*" are not eligible for substitution without evaluation and report updating
 - b) The term "INT" means a "Certified" and/or "Listed" (or a "Recognized" and/or "Accepted") component may be replaced by one "Certified" and/or "Listed" by another certification organization accredited by the appropriate accreditation body or scheme requirements to the correct standard, for the same application; providing the applicable country identifiers are included and requirements in item "d" below are complied with.
 - c) The Term "INT*" means a "Recognized" and/or "Accepted" component may be replaced by one "Recognized" and/or "Accepted" by another certification organization accredited by the appropriate accreditation body or scheme requirements to the correct standard, for the same application, providing the applicable country identifiers are included, the component is **also** CSA Certified, the requirements in item "d" below are complied with and any "conditions of suitability" for the component (as recorded in this descriptive report) are complied with.
 - d) Components which have been substituted, must be of an equivalent rating, configuration (size, orientation, mounting) and the applicable minimum creepage and clearance distances are to be maintained from live parts to bonded metal parts and secondary parts.
 - e) Substitution of a "Certified" and/or "Listed" component with a component that is "Recognized" or "Accepted" is not permitted without evaluation and report updating.

The following table itemizes this product covered along with its electrical ratings.

Model	Description	V	Hz	A	n ₀ /min
MD300N	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
TB30X	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
CM/800/1	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
CM/800/3	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
HF-30A	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
SB35	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
MAGPRO 35 SEMI AUTOMATIC	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
MB300 AUTO	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
MD300A	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550
MD35A	Diamond Core Drill , cord-connected, ground, variable speed	115	60	9.5	550

MODEL DIFFERENCES BY ITEM NO

Model	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
MD300N	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
TB30X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CM/800/1	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
CM/800/3	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
HF-30A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
SB35	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MAGPRO 35 SEMI AUTOMATIC	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MB300 AUTO	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MD300A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
MD35A	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

No	UL CCN.	Component Description	Manufacturer	Material Cat. No.	Rating, Comment, Dimensions	Appr Agency
1	-	Arbor Support Bracket	-	Aluminum	Dimension see drawing 1. Secured to Stand body by screws.	-
2	-	Electromagnet	-	Steel Electromagnet	Dimension see drawing 2. Secured to Stand body by screws. Consist of the followings:	-
a	-	Magnet	-	-	Two provided. Class E. Each seated in Magnetic Base and completely potted with epoxy, minimum 1.5mm thick. The bobbin material also acts as enclosure for coil. Consists of the following components:	-
I	QMFZ2	Bobbin	Nan Ya	PA6 2210G6	Rated HB at 0.75mm thick, HWI-2, HAI-0, CTI-0. Overall 77mm OD by 51mm ID by 36.5mm high by 1.5mm thick.	UL
II		Outerwrap		Mylar	130□C, 1.6mm thick.	UL
		Potting Compound	Shaw Huow Ent.	Epoxy 9001A/9001B	Rated V-0 at 1mm thick, CTI-0.	UL
b		Lead Wires		TEW/UL 1015	20AWG, rated 600Vac, 105□C. One end is terminated in a certified sleeved crimp type quick connect terminal for connection to Printed Wiring Board of Rectifier Module; the other end is mechanically secured and soldered to Coil of Magnet. The lead wires where go through Magnetic Base are additionally sleeved with heat-shrinkable tubing, min 1.0mm nominal thickness.	UL CSA
3	-	Gear base	-	Aluminum Alloy	Dimension see drawing 3 and 4. Combination with Gear base and Gear plate, secured together with screws and spring washers.	-
4	-	Slide plate	-	Aluminum	239mm by 80mm by 25mm thick. Secured to Stand body by screws.	-
5	-	Coolant tank assembly	-	Plastic	For contain oil coolant only, not for water coolant.	-
6	-	Stand body	-	Sheet metal	Dimension see drawing 5. 6mm thick.	-
7	-	Switch plate	-	Steel	125mm by 82mm by 1.6mm. Secured to stand body by screws.	-
8	ELBZ2	Power Supply Cord	-	Type SJTW	16/3 AWG, min. 105°C. 1.8m long min. Provided with NEMA 5-15P plug, polarized. Line/Neutral connects to switch by a fully insulated quick disconnect terminal. Type Y attachment.	CSA UL
9	-	Cord Guard Bushing	-	Rubber	Overall 72mm long with a 16mm OD by 6.8mm thick lip at one end, 13.4mm OD by 3mm thick lip at the other end. Projected outside the tool beyond the inlet opening of 67mm (at least 5 times the overall diameter of power supply cord). Fitted over Power Supply Cord and trap-fitted in Stand body.	-
10	QMFZ2	Strain Relief Motor	Nan Ya (E130155)	Polyamide 6 2210G6	HB, 0.75mm, all colour, HAI-0, HWI-4, CTI-0, 100 °C. Glow wire (550°C) tested at 3mm thick by report 70099540. Overall 26mm by 11mm by 3.5mm. Secured to integral U-shaped boss on motor housing with two screws.	UL CUL

No	UL CCN.	Component Description	Manufacturer	Material Cat. No.	Rating, Comment, Dimensions	Appr Agency
11	QMFZ2	Strain Relief Power cord	Nan Ya (E130155)	Polyamide 6 2210G6	HB, 0.75mm, all colour, HAI-0, HWI-4, CTI-0, 100 °C. Glow wire (550°C) tested at 3mm thick by report 70099540. Overall 26mm by 10mm by 3.6mm. Secured to integral U-shaped boss on Stand body with screws.	UL CUL
12	QCRV2/ QCRV7	Liquid-tight flexible cord fittings	AVC (E210562)	MG16AS	Compression type.	UL CUL
13	QMFZ2	Main Motor Enclosure	Nan Ya (E130155)	Polyamide 6 2210G6	Dimension see drawing 6, 3mm thick. HB, 0.75mm, all colour, HAI-0, HWI-4, CTI-0, 100 °C. Glow wire (550°C) tested at 3mm thick by report 70099540. One-piece construction.	UL
14	QMFZ2	Motor Tail Cover	Nan Ya (E130155)	Polyamide 6 2210G6	HB, 0.75mm, all colour, HAI-0, HWI-4, CTI-0, 100 °C. Glow wire (550°C) tested at 3mm thick by report 70099540. Secured to motor housing by screws. Overall 101mm by 75mm by 42mm by 3mm thick. Provided with 16 ventilation openings, each measured 15 to 47mm long by 2.8mm wide.	UL
15	QMFZ2	Fan baffle	Nan Ya (E130155)	Polyamide 6 2210G6	HB, 0.75mm, all colour, HAI-0, HWI-4, CTI-0, 100 °C. Glow wire (550°C) tested at 3mm thick by report 70099540, secured between motor housing and gear box. Overall 80mm by 90mm by 11mm by 2mm thick.	UL
16	WOYR2/8	On-off switch	ZHEJIANG JIABEN (E219444)	K2-2-2116A	12A, 250Vac or 16A 125Vac. Disconnects both conductors of power supply cord.	UL CUL
17	WOYR2	Control Switch	DICGU (E163371)	Series SM3	3A, 125Vac. Momentary contact type. Quick-connect type Terminal. Secured to control plate by mechanicals. For signal only.	CUL UL
18	WOYR2	Interlock Switch	DICGU (E163371)	Series SW3	0-10A, 125-250Vac, Momentary contact type. Quick-connect type Terminal. Secured to stand body by mechanicals. For signal only.	CUL UL
19	-	Brushes	-	Carbon	Two provided. 17mm long by 7mm wide by 11mm high. Spring loaded. Provided with limited length shunt wire which is shorter than brush holder sleeve to limit brush travel at end of brush life for brush spring retention feature.	-
20	QMFZ2	Brush Holder	CHANG CHUN (E59481)	T310	V-0, 3mm, HAI-0, HWI-1, CTI-3, 150 °C. 40mm by 22mm by 17.5mm by 3mm thick min. Secured to inside enclosure with screws. Provided with two copper alloy blade terminals for electrical connection.	UL
21	AVLV2	Motor Wires	-	TEW/3266	16AWG. Rated 300V, 125°C. One end is connected to Printed Wiring Board with quick connector; the other terminated in a recognized wire connector to main motor.	CSA UL
22	AVLV2	Start capacitor Wires/control wire	-	TEW/1007	22AWG. Rated 300V, 80°C. One end is soldered to Printed Wiring Board; the other terminated in a recognized wire connector to start capacitor.	CSA UL

No	UL CCN.	Component Description	Manufacturer	Material Cat. No.	Rating, Comment, Dimensions	Appr Agency
23	AVLV2	Electromagnet wire	-	TEW/1430	20AWG. Rated 300V, 80°C. One end is soldered to Printed Wiring Board; the other terminated in a recognized wire connector to start capacitor.	CSA UL
24	ZPMV2	Control Board	-	Plastic	V-0, consist of the followings:	UL
a	NLDX2	Relay	TYCO (E58304)	OZ-SS-112LM1	16A, 240Vac.	UL CUL
b	FOWX2	Capacitor (C14/C16/C15)	CARLI (E120045)	MPX (X2)	0.1uf, 275Vac. -40~110C.	UL CUL
c	FOWX2	Alternate Capacitor (C14/C16/C15)	AID (E183539)	MEX series	0.1uf, 275Vac. -40~110C.	UL
d	-	Transformer (TRANS1)	YIN NAN	TL010-1	Input 120Vac, 60Hz; Output 11.0±5% Vac, 120mA. Open coil core type. Class 130. Consists of the following:	Accepted
i	-	Core	-	Silicon sheet steel	0.35mm thick each, 35mm by 30mm by 14mm stack.	
ii	-	Bobbin	E I DUPONT DE NEMOURS & CO INC	FR530L	0.7mm min. Split type, rated 130°C.	UL
iii	-	Primary Winding	Ta Win (E152187)	Enameled copper wire	130°C. 0.09mm dia, 2300 turns.	UL
		Alternate Primary Winding	Jung Shing (E174837)	Enameled copper wire	130°C. 0.09mm dia, 2300 turns.	UL
iv	-	Secondary Winding	Ta Win (E152187)	Enameled copper wire	130°C. 0.30mm dia, 285 turns.	UL
		Alternate Secondary Winding	Jung Shing (E174837)	Enameled copper wire	130°C. 0.30mm dia, 285 turns.	UL
v	-	Transformer Insulation	-	-	Consist of the following:	-
(i)	-	Protector Body to Secondary Winding	-	-	Polyester tape, 3 layers, each 0.05mm thick.	-
(ii)	-	Primary Winding to Secondary Winding	-	-	Bobbin, 1 layer, min 0.7mm thick.	-
(iii)	-	Primary Winding to Core	-	-	Under Winding: Bobbin, 1 layer, min 0.7mm thick. Side (Flange): Bobbin, 1 layer, min 0.7mm thick. Outside Core Window: Core window cover, 1 layer, min 0.7mm thick.	-
(iv)	-	Protector Solder Connection to Primary Winding:	-	-	Polyester tape, 2 layers, each 0.05mm thick.	-
(v)	-	Protector Body to Primary Winding	-	-	Polyester tape, 2 layers, each 0.05mm thick.	-

No	UL CCN.	Component Description	Manufacturer	Material Cat. No.	Rating, Comment, Dimensions	Appr Agency
(vi)	OANZ2	Crossover	TERAOKA(E56086)	570F	Insulating tape, 0.18mm* 1 pcs.	UL
25	-	Stator	-	Laminated Steel	71mm OD by 42mm ID by 45mm stack. Class A insulation.	-
I	OBMW2	Stator Winding	TAI-I (E85640)	Polyester-imide Copper Wire, EIW	155°C. 0.95mm diameter, 54 turn. Formed and held with metal strap with polyester film coated electrical paper insulation to space min. 2.5mm from laminations. Varnish impregnated, 'ELANTAS', E171184, 155°C.	UL
II	QMFZ2	Stator Slot Liner (INT)	JINDAL (E176671)	J 470	105°C, 0.2mm thickness. Extends min. 1.5mm beyond stator laminations.	UL
III	AVLV2	Stator Leads	-	3321/AWM	16AWG, 600V, 150°C. One end is mechanically secured and welded to the coil end, and sleeved with a certified silicone coated fiberglass tube; the other end is crimped to a certified, fully insulated quick disconnect connector for connection to tool switch terminal and for connection to brush holder sleeve terminal.	UL CSA
26	-	Armature	-	Laminated Steel	41mm OD by 45.6mm stack. 12 slots. Class A insulation.	-
I	OBMW2	Armature Winding	TAI-I (E85640)	Polyester-imide Copper Wire, EIW	155°C. 0.6mm diameter, 10 turn. Varnish impregnated, 'ELANTAS', E171184, 155°C.	UL
II	-	Shaft	-	Steel	Double/reinforce insulated. 160mm long.	-
III	QMFZ2	Shaft Insulation	BMC China (E253513)	Unsaturated Polyester BMC FTI901	130°C. Extends through centre of armature laminations, windings and commutator. Min 1mm thick under laminations and commutator as supplementary insulation. Min 2 mm thick under windings as reinforced insulation. Extends minimum 2.5mm beyond commutator support and 5mm beyond windings at fan end. Bearing is spaced 8mm from commutator bars.	UL
IV	QMFZ2	Armature Slot Liner	JINDAL (E176671)	J 470	105°C, 0.25mm thick. Extends min 1.5mm beyond lamination. Slot liner is double folded to retain winding.	UL
V	QMFZ2	Armature Slot Wedge	-	Vulcanized Fibre	1.2mm thick. Extends min. 1.5mm beyond lamination.	UL
VI	QMTS2	Armature End Spider	-	Vulcanized Fibre	Minimum 1.5mm thick at spider.	UL
VII	-	Commutator	-	-	28mm OD, 12.7mm long, including 24 integrally moulded copper alloy commutator bars.	-
VIII	-	Commutator Insulation	-	Phenolic	1.0mm thick min. Basic insulation.	-
IX	-	Fan	-	Plastic	Radial type. 70.5mm dia. by 10.2 mm high. Provided with 14 pitched blades.	-
27	-	Feed Motor	-	-	Rated 230 Vac, 0.2A, 60 Hz, single phase. Class A insulation. Secured to the feed support base by screws.	Accepted

No	UL CCN.	Component Description	Manufacturer	Material Cat. No.	Rating, Comment, Dimensions	Appr Agency
a	-	Motor Enclosure	-	Aluminum	79.1mm OD by 73mm long by 2.9mm thick. Provided with a bracket for mounting, combination with Non drive end-bell.	-
b	-	Drive End Bell	-	Aluminum	Overall 80mm by 80mm by 7mm thick. Secured to motor enclosure bell by 4 bolts, nuts.	-
c	ZMVV/ZM VV7	Wire connector	Interchangeable	Interchangeable	PVC insulated, closed ended, twist-on type. 105°C min, 600 V ac. Suitable for wire size and combination.	UL CSA
d	CZDS2	Start Capacitor	YUHCHANG (E147351)	MPE and MPP Series SFA	Rated 6uF, 250Vac. Provided with two screws terminals.	UL CUL
e	-	Stator	-	Laminated Steel	74.5mm OD by 41mm ID by 35.5mm stack.	-
f	OBMV2	Armature Winding	TAI-I (E85640)	Polyester-imide Copper Wire, EIW	Rated 155°C. Enamelled copper wire, main winding 0.11 mm dia. , 1550 turns. Tied to space 3.0 mm min from laminations. Varnish.	UL CSA
g	QMFZ2	Stator Slot Liner(INT)	JINDAL (E176671)	J 470	105°C, 0.2mm thickness. Extends min. 1.5mm beyond stator laminations.	UL
h	QMFZ2	Stator Slot Wedge	JINDAL (E176671)	J 470	105°C, 0.2mm thickness. Extends min. 1.5mm beyond stator laminations.	UL
u	AVLV2	Stator Lead	Interchangeable	CSA AWM/UL 1007	20AWG, 80°C, 300V. Mechanically secured and welded to winding. Connections are sleeved by Certified fiberglass silicon.	UL CSA
v	-	Rotor	-	Laminated steel	40.4mm OD by 35.5mm stack. Press-fitted to motor shaft.	-
i	-	End Ring	-	-	38.8mm OD by 26.1mm ID by 2.5mm high at each end.	-
j	-	Rotor Shaft	-	Sheet metal	Max 11 mm dia, 98 mm long.	-
k	-	Bearing	-	-	Ball type. Two provided.	-
l	-	Bearing Bracket	-	-	Two provided, integral with motor housing and drive end bell.	-

TEST HISTORY

Ed. 1 : Project 70126797

The following tests were conducted in

1. Submittor's test laboratory located at No. 2 Kejia Rd, Douliu City, Yunlin County, 64057, Taiwan
2. CSA Taichung Laboratory.

Marking – Cl. 8

Label Adhesion - Cl. 8.13

Protection Against access to live parts

Auxiliary Handles – Cl. 9.4

Mechanical Strength (Cl. 20.4)

Capacitor Discharge - Cl. 21.21

Starting - Cl. 10

All tools

Additional tests for centrifugal or other automatic starting switches

Input and Current - Cl. 11

Heating - Cl. 12

Temperature Rise – Cl. 12.1

Leakage Current (Cl. 13) after Heating - Cl. 12.2

Windings exceeds temperatures specified in Table in Cl. 12.5 - Cl. 12.6

Oven Aging

Check for Interturn Shorts Circuits Electric Strength (Cl. 15.2) after Oven Aging.

Humidity (Cl. 14.3)

Electric Strength (Cl. 15.2) after humidity.

Moisture Resistance – Cl. 14

Spillage - 14.2

Electric Strength (Cl. 15.2)

Humidity Conditioning - Cl. 14.3; 48 hours; $93 \pm 2\%$

Electric Strength (Cl. 15.2)

Humidity Overfilling - Cl. 14.4

Humidity withstand pressure - Cl. 14.5

Endurance - Cl. 17

Tools – Cl. 17.2

Electric Strength (Cl 15.3) 50 %, 75 % or 100 % at after conditioning

Centrifugal/Automatic Switches – Cl. 17.3

Electric Strength (Cl 15.3) 50 %, 75 % or 100 % at after conditioning

Abnormal Operation – Cl. 18

Motor Overvoltage - Cl. 18.7

Leakage Current (Cl. 13) after conditioning

Electronic Device, Motor Overvoltage - Cl. 18.10

Leakage Current (Cl 13) after conditioning

Reversing Switches - Cl. 18.11

Extreme Overloads - Cl. 18.12

Leakage Current (Cl. 13) monitored during and after the overload

Electric Strength (Cl. 15.2) after cooled to room temperature

Mechanical Hazards Cl. 19

Cl. (19.101)

Cl. (19.102)

Cl. (19.103)

Cl. (19.104)

Cl. (19.105)

Mechanical Strength Cl. 20;

Switch Actuator Impact - Cl. 20.2

Inspection by (Cl. 9)and (Cl. 27.1) after drops

1 meter Drop - Cl. 20.3

Inspection by (Cl. 9)and(Cl. 27.1)after drops

Electric Strength (Cl. 15.2) after drops

Brush Torque/Impact - Cl. 20.4

Inspection by (Cl. 9)and (Cl. 27.1) after drops

AUXILIARY HANDLES AND GRASPING SURFACES- Cl. 20.5

Construction - Cl. 21

Aging of Rubber Cl. 21.13

Component Test Cl. 23

Capacitor Overvoltage Cl. 23.1

Switch Overloading Cl. 23.1.10

Supply Connections and External Flexible Cables and Cords

Cord Flexing/Cord Guard - Cl. 24.12

Excessive Cord Bending - Cl. 24.13

Strain Relief Abnormal - Cl. 24.14

Terminals and External Conductors – Cl. 25

Earthing Connections, Cl. 26

Resistance; Cl. 26.5

Screw and Connections - Cl. 27

Resistance to Heat, Fire, and Tracking Cl. 29

Ball Pressure - Cl. 29.1

Mold Stress - Cl. 29.1

Resistant to Flame - Cl. 29.2

Resistant to Tracking Test - Cl. 29.3

- Resistance to Rusting - Cl. 30.1
 - Resistance to Rusting - Cl. 30.1

- Thermal Cutouts; Appendix A
 - Operate Reliably – Cl. A1.
 - Resistant to Heating, vibration and etc. - Cl. A2.

- Electronic Faults; Appendix B
 - Insulation Resistance and Electric Strength - Cl. B15.1
 - Endurance - Cl. B16
 - Abnormal Operation - Cl. B17.101

- Accessories/Attachments; Appendix F
 - Resistant to Overspeed - Cl. F19.102
 - Sharp Edge - Cl. F20.101

- Resistant to Tipping - Cl. F20.102

PRODUCT TESTED: Model MD300N

Marked Rating: 115 V, 60 Hz, 9.5 A

STARTING TEST: Cl. 10

Data Observation:			
Condition	Operated reliably	Overload tripped (15A fuse)	Switches chattered
<input checked="" type="checkbox"/> All tools started ten times at 97.8V (0.85 x rated voltage)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<input type="checkbox"/> Tools with centrifugal switches or other automatic switches started ten times at V(1.1 x rated voltage)	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Cl.	Requirement - Test	Result – Remark	Verdict
10	Starting	See Data Observation	<input checked="" type="checkbox"/> P <input type="checkbox"/> F <input type="checkbox"/> N/A

INPUT CURRENT TEST: Cl. 11

Data Observation:							
Volts	Hz	Amps	Input Watts	Output Watts	RPM	Torque kgm	Conditions
115	60	5.4	620	-	4900	-	No Load
108	60	9.12	990	-	3424	0.161	Rated Load (94% voltage)
115	60	9.76	1116	-	3610	0.157	Rated Load
122	60	9.6	1163	-	3915	0.157	Rated Load (106% voltage)
149.5	60	6.28	944	-	6099	-	Over voltage
115	60	23.8	-	-	-	-	Locked rotor

The rated power input or rated current shall be at least 110 % of the measured no-load input or current.

Data Observation:							
Volts	Rated W	Cl. 11.1 measured W	W dev	Rated A	measured A (No load)	A dev	Conditions
115	-	-	-	9.5	5.4	175.9%	[X] Rated Load [] Normal load (Part 2)
Cl.	Requirement - Test			Result - Remark			Verdict
11	Rated input/current Dev at least 110 %?			See Data Observation			[X] P [] F [] N/A
				[X] Yes	[] No		

HEATING TEST: Cl. 12

The tool is operated in still air under normal load. While the torque is maintained, the voltage is then adjusted to 0.94 times the rated voltage or 1.06 times the rated voltage, or the mean of the rated voltage range, whichever is the most unfavourable.

Data Observation:						
Load: Brake at rated voltage and [X] rated input, [] normal load						
Operating period: [] rated operating time _____, [] consecutive cycles _____, [X] continuous operation.						
Condition of operation: i.e. Condition as required by part 2: Operated for 30 minutes						
Test voltage	108V (94%)	115V (100%)	122V (106%)			-
Input current (A)	9.12	9.76	9.6			-
Input wattage (W)	990	1116	1163			-
Torque (kgm)	0.161	0.157	0.157			-
	Temperature rise in °C					Allowed Limit
Stator winding (S ₁)R-R	22.1	-	-			75
Stator winding (S ₂)R-R	29.6	-	-			75
Armature winding (R-R)	53.6	-	-			75
Motor enclosure	7.2	-	6.9			60
Switch knob	17.4	-	14			50
Brush holder	37.5	-	38.3			80
Power supply lead	29.5	-	25.7			80
Internal wiring	4.4	-	4.4			80
Triac	31.6	-	26.2			100
PCB thermal module	30.5	-	25.9			Ref
Ambient	24.7	-	24.3			-

Note: For rise of resistance calculation:
 Temp. rise = $\frac{(R_2 - R_1) (234.5 + t_1)}{R_1} - (t_2 - t_1)$ (for copper)

Test voltage	108V (94%)	115V (100%)	122V (106%)			
	Resistance in ohm					Allowed Limit
R ₂ (ohm) of stator winding S ₁ Hot	0.31	--	--			-
R ₂ (ohm) of stator winding S ₂ Hot	0.32	--	--			-
R ₂ (ohm) of armature winding Hot	0.88	--	--			-
Ambient temperature (t ₁)	24.3	--	--			-
Ambient temperature (t ₂)	24.7	--	--			-
Resistance of windings at t ambient: 25.7°C R ₁ of stator winding S ₁ = <u>0.28</u> ohm cold R ₁ of stator winding S ₂ = <u>0.28</u> ohm cold R ₁ of armature winding = <u>0.7</u> ohm cold; between opposite segments. Insulation Class: A						
12.5	No flowing of Sealing compounds	Part:		[X] P [] F [] N/A		
12.5	Protective devices did not operate			[X] P [] F [] N/A		
Cl.	Requirement - Test	Result - Remark		Verdict		
12	Heating	See Data Observation		[X] P [] F [] N/A		

LEAKAGE CURRENT FOLLOWING HEATING TEST: Cl. 13

Protective impedance is disconnected from live parts before carrying out the tests.

The leakage current is measured within 5 s after the application of the test voltage and shall not exceed the following values.

Data Observation: Performed at 1.06 x rated voltage = 122 V, 60 Hz					
Leakage current, Cl. 13					
Points of application:	Measured		Max. allowed		
	Tool switch ON (mA)	Tool switch OFF*(mA)	Class I	Class II	Class III
Between line 1 and accessible metal or metal foil	0.065	-	0.5 mA	0.25 mA	0.5 mA
Between line 2 and accessible metal or metal foil	0.035	-	0.5 mA	0.25 mA	0.5 mA
Cl.	Requirement - Test	Result - Remark		Verdict	
13	Leakage Current After Heating	See Data Observation		[X] P [] F [] N/A	

Note: * If the tool incorporates one or more capacitors, and is provided with a single-pole switch, the measurements are repeated with the switch in the "off" position.

MOISTURE RESISTANCE TEST: Cl. 14

HUMIDITY TREATMENT: Cl. 14.3

Tools are kept in humidity cabinet containing air with relative humidity of $93 \pm 2 \%$, temperature of 20 to 30°C for 48 hours.

Before being placed in the humidity cabinet, the sample is brought to a temperature between t and $(t + 4)^\circ\text{C}$. The tool is considered to be brought to the specified temperature by keeping it at this temperature for at least 4 h before the humidity treatment.

Data Observation: Performed at 1.06 x rated voltage = 122 V, 60 Hz						
Leakage current, Cl. 13						
		Measured		Max. allowed		
Points of application:		Tool switch ON (mA)	Tool switch OFF*(mA)	Class I	Class II	Class III
Between line 1 and accessible metal or metal foil		0.07	-	0.5 mA	0.25 mA	0.5 mA
Between line 2 and accessible metal or metal foil		0.04	-	0.5 mA	0.25 mA	0.5 mA
Cl.	Requirement - Test	Result – Remark		Verdict		
14.3	Leakage Current After Humidity Treatment	See Data Observation		[X] P [] F [] N/A		

Note: * If the tool incorporates one or more capacitors, and is provided with a single-pole switch, the measurements are repeated with the switch in the "off" position.

Data Observation:						
Electric strength, Cl. 15.2						
CLASS	III	Test	II	Test	I	Test
Points of application:	Test voltage					
1. Between live parts and parts of the body that are separated from live parts by: - Basic insulation only - Reinforced insulation	500 ---	[]	--- 3750	[]	1250 3750	[X] [X]
2. For parts with double insulation, between metal parts separated from live parts by basic insulation only, and - Live parts - The body			1250 2500	[] []	1250 2500	[N/A] [X]
3. Between metal enclosures or covers lined with insulating material and metal foil in contact with the inner surface of the lining, if the distance between live parts and these metal enclosures or covers, measured through the lining, is less than the clearances in Cl. 28.1	---		2500	[]	1250	[N/A]
4. Between metal foil in contact with handles, knobs, grips, and the like and their shafts, if these shafts can become live in the event of an insulation fault.	---		2500	[]	2500	[X]

5. Between accessible parts and internal diameter of cord guard wrapped with metal foil	---		2500	[]	1250	[X]
6. Between the point where a winding and a capacitor are connected together, if a resonance voltage U occurs between this point and any terminal for external conductors, and - accessible parts 1) - insulation only metal parts separated from live parts by basic	---		---		2U+1000	[N/A]
	---		2U+1000	[]	---	
1) The test between the point where a winding and a capacitor are connected together, and accessible parts or metal parts, is only made where the insulation is subjected to the resonance voltage under normal running conditions. Other parts are disconnected, and the capacitor is short-circuited.						

Note: * Protective impedance is disconnected from live parts before carrying out the tests.
Accessible parts of insulated material are covered with metal foil.

Cl.	Requirement - Test	Result - Remark	Verdict
14.3	Electric Strength After Humidity Treatment	See Data Observation	[X] P [] F [] N/A

Cl.	Requirement - Test	Result - Remark	Verdict
14.3	Humidity Treatment	See Data Observation	[X] P [] F [] N/A

TOOLS WITH LIQUID SYSTEM (overfilling): Cl 14.4

The tool is operated at rated voltage with approximately 1,0 % NaCl solution in the following modes if applicable:

- after overfilling of the fluid reservoir by 15 % of the capacity of the container, or by 0,25 l, whichever is the greater;
- omission of a washer or other user removable part;
- mis-assembly of liquid system connections routinely made by the user.

Data Observation: Performed at 1.06 x rated voltage = 122 V, 60 Hz				
Leakage current, Cl. 13				
	Measured (max)		Max. allowed	
Points of application:	Tool switch ON (mA)	Tool switch OFF*(mA)	Class I	Class II
Between line 1 and accessible metal or metal foil	-	-	5 mA	2 mA
Between line 2 and accessible metal or metal foil	-	-	5 mA	2 mA
Cl.	Requirement - Test	Result - Remark	Verdict	
14.5	Leakage Current	See Data Observation	[] P [] F [X] N/A	

Following the test, the leakage current was measured after being allowed to dry for 24 h at ambient temperature:

Data Observation: Performed at 1.06 x rated voltage = 122 V, 60 Hz					
Leakage current, Cl. 13					
		Measured		Max. allowed	
Points of application:		Tool switch ON (mA)	Tool switch OFF*(mA)	Class I	Class II
Between line 1 and accessible metal or metal foil		-	-	0.5 mA	0.25 mA
Between line 2 and accessible metal or metal foil		-	-	0.5 mA	0.25 mA
Cl.	Requirement - Test	Result – Remark		Verdict	
14.5	Leakage Current	See Data Observation		[] P [] F [X] N/A	

※Waive due to this is not a water system.

Note: * If the tool incorporates one or more capacitors, and is provided with a single-pole switch, the measurements are repeated with the switch in the "off" position.

TOOLS WITH LIQUID SYSTEM (withstanding pressure): Cl 14.5

The residual current device was disabled during the test.

The liquid system was closed and an approximately 1.0% NaCl solution at a hydrostatic pressure equal to twice the maximum permitted pressure of the liquid supply was applied for 1 h.

Data Observation: Performed at 1.06 x rated voltage = 122 V, 60 Hz					
Leakage current, Cl. 13					
		Measured (max)		Max. allowed	
Points of application:		Tool switch ON (mA)	Tool switch OFF*(mA)	Class I	Class II
Between line 1 and accessible metal or metal foil		-	-	5 mA	2 mA
Between line 2 and accessible metal or metal foil		-	-	5 mA	2 mA
Cl.	Requirement - Test	Result – Remark		Verdict	
14.5	Leakage Current	See Data Observation		[] P [] F [X] N/A	

Following the test, the leakage current was measured after being allowed to dry for 24 h at ambient temperature:

Data Observation: Performed at 1.06 x rated voltage = 122 V, 60 Hz					
Leakage current, Cl. 13					
		Measured		Max. allowed	
Points of application:		Tool switch ON (mA)	Tool switch OFF*(mA)	Class I	Class II
Between line 1 and accessible metal or metal foil		-	-	0.5 mA	0.25 mA
Between line 2 and accessible metal or metal foil		-	-	0.5 mA	0.25 mA
Cl.	Requirement - Test	Result – Remark		Verdict	
14.5	Leakage Current	See Data Observation		[] P [] F [X] N/A	

※Waive due to this is not a water system.

Note: * If the tool incorporates one or more capacitors, and is provided with a single-pole switch, the measurements are repeated with the switch in the "off" position.

ENDURANCE TEST: Cl. 17

[X] Operated per Part 1; 24 hours at 1.1 times rated voltage then 24 hours at 0.9 times rated voltage

[X] Operated in cycles comprising an "on" period of 100 sec and an "off" of 20 sec.

[] Tools for short-time or intermittent operation per standard 60745-2-_____.

During the test, the tool is placed in three different positions, the operating time, at each test voltage, being approximately 8 h for each position.

Tools provided with a centrifugal or other automatic starting switch is started 10,000 times under normal load, and at a voltage equal to 0.9 times rated voltage, the operating cycle being that specified in 17.2.

Electric strength, after above test, conducted at 75 % of the specified values, per Cl. 17.1.

Data Observation:						
Electric strength, Cl. 15.2						
CLASS	III	Test	II	Test	I	Test
Points of application:	Test voltage					
1. Between live parts and parts of the body that are separated from live parts by: - Basic insulation only - Reinforced insulation	375 ---	[]	--- 2813	[]	938 2813	[X] [X]
2. For parts with double insulation, between metal parts separated from live parts by basic insulation only, and - Live parts - The body			938 1875	[] []	938 1875	[N/A] [X]
3. Between metal enclosures or covers lined with insulating material and metal foil in contact with the inner surface of the lining, if the distance between live parts and these metal enclosures or covers, measured through the lining, is less than the clearances in Cl. 28.1	---		1875	[]	938	[N/A]
4. Between metal foil in contact with handles, knobs, grips, and the like and their shafts, if these shafts can become live in the event of an insulation fault.	---		1875	[]	1875	[X]
5. Between accessible parts and internal diameter of cord guard wrapped with metal foil	---		1875	[]	938	[X]
6. Between the point where a winding and a capacitor are connected together, if a resonance voltage U occurs between this point and any terminal for external conductors, and - accessible parts 1) - insulation only metal parts separated from live parts by basic	---		--- 1.5U+750	[]	1.5U+75 0 ---	[N/A]
1) The test between the point where a winding and a capacitor are connected together, and accessible parts or metal parts, is only made where the insulation is subjected to the resonance voltage under normal running conditions. Other parts are disconnected, and the capacitor is short-circuited.						

Data Observation:			
Was insulation system damaged?	Did the overload protection operate?	Did connection come loose?	Were there other conditions that impaired safety?
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Cl.	Requirement - Test	Result - Remark	Verdict
17	All Tools	See Data Observation	<input checked="" type="checkbox"/> P <input type="checkbox"/> F <input type="checkbox"/> N/A

ABNORMAL TEST: Cl. 18

OVERVOLTAGE ON SERIES MOTORS: Cl. 18.7

Tool is operated at 1.3 times rated voltage for 1 min.

Data Observation:			
Did windings and/or connections become loose?			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Were there signs of corrosion at connections (Cl. 21.25).			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Were there any other hazards created?			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Cl.	Requirement - Test	Result - Remark	Verdict
18.7	Overvoltage on Series Motor	See Data Observation	<input checked="" type="checkbox"/> P <input type="checkbox"/> F <input type="checkbox"/> N/A

Data Observation: Performed at 1.06 x rated voltage = 122 V, 60 Hz						
Leakage current, Cl. 13						
		Measured		Max. allowed		
Points of application:		Tool switch ON (mA)	Tool switch OFF*(mA)	Class I	Class II	Class III
Between line 1 and accessible metal or metal foil		0.065	-	0.5 mA	0.25 mA	0.5 mA
Between line 2 and accessible metal or metal foil		0.035	-	0.5 mA	0.25 mA	0.5 mA
Cl.	Requirement - Test	Result - Remark		Verdict		
14.3	Leakage Current After Overvoltage	See Data Observation		<input checked="" type="checkbox"/> P <input type="checkbox"/> F <input type="checkbox"/> N/A		

Note: * If the tool incorporates one or more capacitors, and is provided with a single-pole switch, the measurements are repeated with the switch in the "off" position.

Cl.	Requirement - Test	Result - Remark	Verdict
17.2	Overvoltage	See Data Observation	<input checked="" type="checkbox"/> P <input type="checkbox"/> F <input type="checkbox"/> N/A

OVERVOLTAGE ON TOOL INCORPORATING ELECTRONIC DEVICES: Cl. 18.10

Tool is operated for 1min at rated voltage with the electronic device short-circuited and open-circuited.

Data Observation	
Does the tool show no damage due to fire, mechanical damage impairing safety and protection against electric shock?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No

Note: * Tools incorporating a single pole switch and capacitors are to be tested in the on and off position.

Data Observation after electronic device is shorted: Performed at 1.06 x rated voltage = 122 V, 60 Hz					
Leakage current, Cl. 13					
	Measured		Max. allowed		
Points of application:C4	Tool switch ON (mA)	Tool switch OFF*(mA)	Class I	Class II	Class III
Between line 1 and accessible metal or metal foil	0.015	-	0.5 mA	0.25 mA	0.5 mA
Between line 2 and accessible metal or metal foil	0.06	-	0.5 mA	0.25 mA	0.5 mA
Points of application:C12	Tool switch ON (mA)	Tool switch OFF*(mA)	Class I	Class II	Class III
Between line 1 and accessible metal or metal foil	0.015	-	0.5 mA	0.25 mA	0.5 mA
Between line 2 and accessible metal or metal foil	0.06	-	0.5 mA	0.25 mA	0.5 mA
Points of application:R48	Tool switch ON (mA)	Tool switch OFF*(mA)	Class I	Class II	Class III
Between line 1 and accessible metal or metal foil	0.025	-	0.5 mA	0.25 mA	0.5 mA
Between line 2 and accessible metal or metal foil	0.055	-	0.5 mA	0.25 mA	0.5 mA
Points of application: RB1	Tool switch ON (mA)	Tool switch OFF*(mA)	Class I	Class II	Class III
Between line 1 and accessible metal or metal foil	0.015	-	0.5 mA	0.25 mA	0.5 mA
Between line 2 and accessible metal or metal foil	0.06	-	0.5 mA	0.25 mA	0.5 mA
Points of application: RB2	Tool switch ON (mA)	Tool switch OFF*(mA)	Class I	Class II	Class III
Between line 1 and accessible metal or metal foil	0.02	-	0.5 mA	0.25 mA	0.5 mA
Between line 2 and accessible metal or metal foil	0.06	-	0.5 mA	0.25 mA	0.5 mA
Points of application: RB3	Tool switch ON (mA)	Tool switch OFF*(mA)	Class I	Class II	Class III
Between line 1 and accessible metal or metal foil	0.03	-	0.5 mA	0.25 mA	0.5 mA
Between line 2 and accessible metal or metal foil	0.06	-	0.5 mA	0.25 mA	0.5 mA
Cl.	Requirement - Test	Result - Remark	Verdict		
18.10	After Electronic Device Is Shorted	See Data Observation	<input checked="" type="checkbox"/> P <input type="checkbox"/> F <input type="checkbox"/> N/A		

Note: * Tools incorporating a single pole switch and capacitors are to be tested in the on and off position.

Data Observation after electronic device is opened: Performed at 1.06 x rated voltage = 122 V, 60 Hz						
Leakage current, Cl. 13						
		Measured		Max. allowed		
Points of application:		Tool switch ON (mA)	Tool switch OFF*(mA)	Class I	Class II	Class III
Between line 1 and accessible metal or metal foil		0.03	-	0.5 mA	0.25 mA	0.5 mA
Between line 2 and accessible metal or metal foil		0.06	-	0.5 mA	0.25 mA	0.5 mA
Cl.	Requirement - Test	Result - Remark		Verdict		
18.10	Leakage Current After Electronic Device Is Opened	See Data Observation		[X] P [] F [] N/A		

Cl.	Requirement - Test	Result - Remark	Verdict
18.10	Overvoltage On Tools Incorporating Electronic Devices	See Data Observation	[X] P [] F [] N/A

MECHANICAL HAZARDS: Cl. 19

Data Observation:			
Were Protective enclosures, covers, guards and the like removable without the aid of a tool?		[] Yes [X] No	
Did the standard test finger touch dangerous moving parts enclosed?		[] Yes [X] No	
Were accessible parts likely to be touched during normal use free from sharp edges, burrs, flashes and the like?		[X] Yes [] No	
Did the use and adjustment of a guard create other dangers? (e.g. by reducing or obstructing the operator's view, by transferring heat)		[] Yes [X] No	
Did the guard have an easily accessible means of accurate adjustment?		[X] Yes [] No	
Cl.	Requirement - Test	Result - Remark	Verdict
19	Mechanical Hazards	See Data Observation	[X] P [] F [] N/A

MECHANICAL STRENGTH TEST: Cl. 20

The tool was subjected to three impacts at every point of the enclosure that was expected to be weak and parts that served as decorative parts overlying an inner cover were removed prior to the impacts. A spring-operated impact test apparatus constructed according to Clause 5 of IEC 60068-2-75 was used to deliver the impacts to the tool. Impacts were also delivered to protective devices, handles, levers knobs and the like. The spring was adjusted so as to cause the hammer to strike with impact energy of:

IMPACT ON SWITCH ACTUATORS: Cl. 20.2

1.0 N·m impact.

Data Observation:		
Was switch operable?		[X] Yes [] No
Were live parts accessible?		[] Yes [X] No

Cl.	Requirement - Test	Result - Remark	Verdict
20.2	After Impacts On Switch	See Data Observation	[X] P [] F [] N/A

EXPOSED BRUSH CAPS AND THEIR HOLDERS: Cl. 20.2

Brush cap impact: One impact, 0.5 N·m

Data Observation:			
Was there any damage or cracks?			<input type="checkbox"/> Yes <input type="checkbox"/> No
Cl.	Requirement - Test	Result - Remark	Verdict
20.2	Impact On Brush Cap	See Data Observation	<input type="checkbox"/> P <input type="checkbox"/> F <input checked="" type="checkbox"/> N/A

※ No brush cap.

Brush cap torque (for threaded brush caps): Remove and replace brush cap 10 times.

Torque applied 0.6 N·m

Data Observation:			
Was there any damage or cracks?			<input type="checkbox"/> Yes <input type="checkbox"/> No
Cl.	Requirement - Test	Result - Remark	Verdict
20.4	After torque test	See Data Observation	<input type="checkbox"/> P <input type="checkbox"/> F <input checked="" type="checkbox"/> N/A

※ No brush cap.

DROP TEST: Cl. 20.3

A hand-held tool shall withstand being dropped three times on a concrete surface from a height of 1 m. The sample shall be positioned to vary the point of impact.

Data Observation:			
Did the impact expose any live parts?			<input type="checkbox"/> Yes <input type="checkbox"/> No
Cl.	Requirement - Test	Result - Remark	Verdict
20.3	Impacts	See Data Observation	<input type="checkbox"/> P <input type="checkbox"/> F <input checked="" type="checkbox"/> N/A

※ Not a hand-held tool.

Data Observation:						
Electric strength, Cl. 15.2						
CLASS	III	Test	II	Test	I	Test
Points of application:	Test voltage					
1. Between live parts and parts of the body that are separated from live parts by: - Basic insulation only - Reinforced insulation	500 ---	<input type="checkbox"/>	--- 3750	<input type="checkbox"/>	1250 3750	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
2. For parts with double insulation, between metal parts separated from live parts by basic insulation only, and - Live parts - The body			1250 2500	<input type="checkbox"/> <input type="checkbox"/>	1250 2500	<input type="checkbox"/> <input checked="" type="checkbox"/>
3. Between metal enclosures or covers lined with insulating material and metal foil in contact with the inner surface of the lining, if the distance between live parts and these metal enclosures or covers, measured through the lining, is less than the clearances in Cl. 28.1	---		2500	<input type="checkbox"/>	1250	<input type="checkbox"/> <input checked="" type="checkbox"/>
4. Between metal foil in contact with handles, knobs, grips, and the like and their shafts, if these shafts can become live in the event of an insulation fault.	---		2500	<input type="checkbox"/>	2500	<input type="checkbox"/> <input checked="" type="checkbox"/>
5. Between accessible parts and internal diameter of cord guard wrapped with metal foil	---		2500	<input type="checkbox"/>	1250	<input type="checkbox"/> <input checked="" type="checkbox"/>

6. Between the point where a winding and a capacitor are connected together, if a resonance voltage U occurs between this point and any terminal for external conductors, and - accessible parts 1) - insulation only metal parts separated from live parts by basic	---	---	2U+1000	[]	2U+1000	[N/A]
1) The test between the point where a winding and a capacitor are connected together, and accessible parts or metal parts, is only made where the insulation is subjected to the resonance voltage under normal running conditions. Other parts are disconnected, and the capacitor is short-circuited.						

Cl.	Requirement - Test	Result - Remark	Verdict
20.1	Electric Strength After Impact	See Data Observation	[] P [] F [X] N/A

AUXILIARY HANDLES AND GRASPING SURFACES: Cl. 20.5

A separate sample, at the discretion of the manufacturer, is to be subjected to a single impact on each handle and each recommended grasping surface. The impacts are carried out from a height of 1 m onto a concrete surface.

Data Observation:			
Electric strength Cl. 15.2			
Points of application:		Test voltage	
Between the grasping surfaces in contact with foil and the output shaft of the tool.		1,250	
Cl.	Requirement - Test	Result - Remark	Verdict
15.2	Electric Strength After impact	See Data Observation	[X] P [] F [] N/A

Data Observation:			
Did the impacts deteriorate the mechanical strength of the auxiliary handles and/or grasping surfaces?			[] Yes [] No
Cl.	Requirement - Test	Result - Remark	Verdict
20.5	Impacts on auxiliary handle	See Data Observation	[X] P [] F [] N/A

COMPONENTS: Cl. 23

SWITCH: Cl. 23.1.10

50 operations on switch at 115 volts AC, 23.8 Amps, motor stalled.

Switch Type	Manufacture	Catalogue No	Tested at:		
			Volts	Hz	Amps
On-off switch	JheJing Jiaben (E219444)	K2-2-2116A	115	60	23.8

Note: Uncertified switches shall be tested to CSA/UL 61058-1

Data Observation:			
Was the switch operable?			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Cl.	Requirement - Test	Result - Remark	Verdict
23.1.10	Switch Overload	See Data Observation	<input checked="" type="checkbox"/> P <input type="checkbox"/> F <input type="checkbox"/> N/A

Note: The switch was evaluated by UL and 50,000 cycles of operation was tested with satisfactory result, switch description.

SUPPLY CONNECTIONS: Cl. 24

FLEXING TEST: Cl. 24.12

20,000 cycles of operation

Tool Mass (Kg) = 16.5 kg, Mass applied 2 kg to 6 kg

Note: Mass of tool does not include the supply cord.

After 10,000 flexings, the sample is turned through 90° about the centre line of the cord guard.

Mass (kg)	Cord Manufacture	AWG	Conductors	Type
6	TA AN ELECTRIC CO LTD	16	3	SJTW

Data Observation:								
Broken strands not more than 10 percent.								
Neutral Conductor			Line Conductor			Ground Conductor		
# strands	# broken strands	% broken	# strands	# broken strands	% broken	# strands	# broken strands	% broken
26	0	0	26	0	0	26	0	0
Cl.	Requirement - Test	Result - Remark		Verdict				
24.12	Flexing	See Data Observation		<input checked="" type="checkbox"/> P <input type="checkbox"/> F <input type="checkbox"/> N/A				

Immediately after this test the cord anchorage and the terminal screws were loosened, without removing the conductors of the flexible cable or cord.

The cord anchorage was not loosened since the cord guard was clamped under the cord anchorage, but the terminals screws were loosened.

The tool was then lifted by the cord guard without jerks, over a distance of 500 mm in one second and replaced on a supporting surface. This was repeated ten (10) times.

Data Observation:			
Did Cord Guard slip out of its location?			<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Cl.	Requirement - Test	Result - Remark	Verdict
24.12	Flexing	See Data Observation	<input checked="" type="checkbox"/> P <input type="checkbox"/> F <input type="checkbox"/> N/A

CORD GUARD BENDING TEST: Cl. 24.13

Since the cord guard was temperature sensitive, the test was conducted at a temperature of 23 ± 2 °C.

Data Observation:			
Diameter of cord (D)	Length of guard	Mass 10(D ²)	Curvature in mm
8.5 mm	66 mm	723 g	Measured: 68 Calculated 1.5D: 12.75
Cl.	Requirement - Test	Result - Remark	Verdict
24.13	Cord Guard Bending	See Data Observation	[X] P [] F [] N/A

STRAIN RELIEF TEST: Cl. 24.14

The cord is subjected 25 times to a pull of the value shown in Table below. The pulls are applied without jerks in the most unfavorable direction each time for 1 s.

Immediately afterwards, the cord, other than that of an automatic cord reel, is subjected for 1 min to a torque of the value shown in Table below.

	Mass of tool (kg)	Pull (N)	Torque (N·m)
[]	Up to and including 1	30	0.1
[]	Over 1 up to and including 4	60	0.25
[X]	Over 4	100	0.35

Data Observation:			
Is the cord damaged?			[] Yes [X] No
Displacement			
0 mm on cord		0 mm on conductor at terminal	
Cl.	Requirement - Test	Result - Remark	Verdict
24.14	Strain Relief	See Data Observation	[X] P [] F [] N/A

WIRE PULL TEST: CL.24.20

For pillar terminals (with conductors that are not separately clamped 30 mm or less from terminal), and for other terminals with screw clamping, a force of 2 N applied to the wire in any direction and adjacent to the terminal, screw or stud

Data Observation:			
The uninsulated end of the conductor did come into contact with accessible metal parts?			[] Yes [X] No
Cl.	Requirement - Test	Result - Remark	Verdict
24.20	Wire Pull	See Data Observation	[X] P [] F [] N/A

TERMINALS FOR EXTERNAL CONDUCTORS: Cl. 25

No terminal for external conductors.

PROVISION FOR EARTHING (CLASS I ONLY): Cl. 26

Test Current (A)	Max Volt Drop (V)	Test Time (min)	Calculated Resistance (ohm)	From	To
25	1.05	2	0.042	Earthing terminal	Accessible metal part

Data Observation:			
The resistance not exceed 0.1 ohm.			
Cl.	Requirement - Test	Result - Remark	Verdict
26.5	Resistance of Earthing Terminal	See Data Observation	[X] P [] F [] N/A

SCREWS AND CONNECTIONS: Cl. 27

TORQUE TEST WITHOUT DAMAGE TO SCREW CONNECTIONS: Cl. 27.1

Fixings, and electrical connections, the failure of which may impair compliance with this standard, shall withstand the mechanical stresses occurring in normal use.

Data Observation:					
Type of screw (I, II, III)	Location	Diameter of screw (mm)	Torque applied (N·m)	No. of applications (5 or 10)	Damage screw connections
II	Grip	3.8	1.2	5	[]Yes [X]No
II	Earthing	3.8	1.2	5	[]Yes [X]No
II	Switch panel	3.8	1.2	10	[]Yes [X]No
Cl.	Requirement – Test		Result - Remark		Verdict
27.1	Torque test on Screw Connection		See Data Observation		[X] P [] F [] N/A

RESISTANCE TO HEAT, FIRE AND TRACKING: Cl. 29

[] RESISTANCE TO HEAT: Cl. 29.1

External parts of non-metallic material, parts of insulating material supporting live parts, including connections and parts of thermoplastic material providing supplementary insulation or reinforced insulation, the deterioration of which might cause the tool to fail to comply with this standard, shall be sufficiently resistant to heat.

Prior to starting the test, the part was maintained for 24 hours in an atmosphere having a temperature between 15 °C and 35 °C, and a relative humidity between 45-75 %. The apparatus was brought to specified oven temperature prior to starting the test.

The part was supported so that its upper surface was supported horizontally. The spherical part of the apparatus was pressed against the surface of the test sample with a force of 20 N. The thickness of the part under test was at least 2.5 mm. In specific situations, as identified below, two or more sections of the part were placed on top of one another to obtain the minimum test thickness.

The test was made in a heating cabinet set at a temperature of (40 ± 2) °C plus the maximum temperature rise occurring on the part during the Heating Test, but it was at least

- [] (75 ± 2) °C for external parts;
- [] (125 ± 2) °C for parts retaining live parts in position.

Data Observation:			
	Impression diameter limited to ≤ 2 mm	-	-
Parts under test		Test Temperature (°C)	Measured impression dia. (mm)
Enclosure			
Brush Cover			
Supplementary information:			
Cl.	Requirement – Test	Result - Remark	Verdict
29.1	ball-pressure test	See Data Observation	[] P [] F [X] N/A

※Refer to submittor’s report 2656066.

RESISTANCE TO FIRE: Cl. 29.2

Parts of non-metallic material shall be adequately resistant to ignition and to spread of fire.

Recognized HB40, or

Recognized V-rated material, or

Glow wire test.

Data Observation:					
Test Conditions	Tested according to IEC 60695-2-11				
Test Temperature (°C)	550				
Test specimen	Material type	Specified layer placed underneath test specimen	Material ignited	Specified layer under test specimen ignited	Results
					<input type="checkbox"/> P <input type="checkbox"/> F
Supplementary information:					
Cl.	Requirement – Test	Result - Remark		Verdict	
29.2	Resistance to fire test	See Data Observation		<input type="checkbox"/> P <input type="checkbox"/> F <input checked="" type="checkbox"/> N/A	

※Refer to submittor’s report 2656066.

RESISTANCE TO TRACKING: Cl. 29.3

Insulating parts supporting or retaining bare live parts in position and subjected to disposition of dirt (i.e. Brush holders, brush holder supports, etc.) shall meet the following:

CTI of 175V or greater, or

Resistance to tracking test

Data Observation:					
Test Conditions	Tested according to IEC 60112				
Test Solution	0.1% NH4CL				
Test Voltage (V)	175				
Test specimen	Material type	Tracking occurred	Rate of tracking	Results	
Support of control board	2210G6	No	2 drops/min	<input type="checkbox"/> P <input type="checkbox"/> F	
Supplementary information:					
Cl.	Requirement - Test	Result - Remark		Verdict	
29.3	Resistance to tracking test	See Data Observation		<input type="checkbox"/> P <input type="checkbox"/> F <input checked="" type="checkbox"/> N/A	

※Refer to submittor’s report 2656066.

---End of Report---