

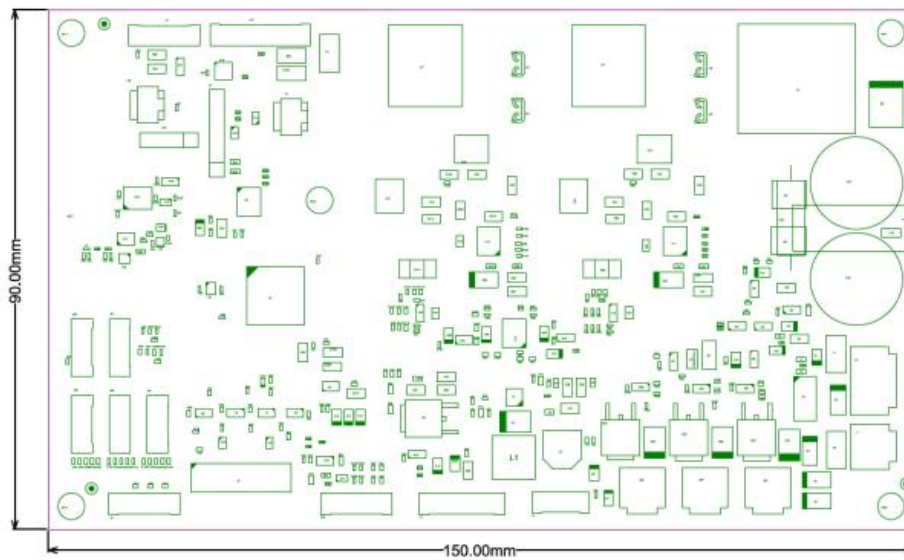
<i>Spec. Rel.</i>	<i>Hardware Release</i>	<i>Software Release</i>	<i>Release Date</i>	<i>Description</i>
1.0	Rev_B	Rev_A	09/03/2023	RELEASED FOR PRODUCTION

**ELECTRONIC BOARD P/N**

<i>Description</i>	<i>Nilfisk P/N</i>	<i>Supplier P/N</i>	<i>Last Spec. Rel. reference</i>	<i>Status</i>
EB1 (Function board P27) hardware only	106420327	n.a.	/	ACTIVE
EB1 (Function board P27) with the SC351 firmware	55942260	n.a.	/	ACTIVE
EB2 (Display board UI)	146 3073 000	n.a.	/	ACTIVE

**LAY-OUT**

For mechanical constraints refers to the Nilfisk drawings.



**EB1 (P27) CONNECTORS (on EB1 side A)**

<i>J3 BATTERY: KP02215000J0G</i>					
<i>PIN</i>	<i>Description</i>	<i>in/out</i>	<i>V ref.</i>	<i>I max.</i>	<i>Connected to</i>
-	Vbatt +	In	24V	35A	BAT+
-	Vbatt -	In	0V	35A	BAT-

<i>J4 CHARGER IN: JST B3P-VH (3 ways, vertical)</i>					
<i>PIN</i>	<i>Description</i>	<i>in/out</i>	<i>V ref.</i>	<i>I max.</i>	<i>Connected to</i>
1	Power supply +	In	24V	<1A	CH1.COM
3	Charger in	In	24V	<1A	CH1.NC

<i>J5 ROTARY SWITCH : B5B-EH-A (5 ways, vertical)</i>					
<i>PIN</i>	<i>Description</i>	<i>in/out</i>	<i>V ref.</i>	<i>I max.</i>	<i>Connected to</i>
1	SWITCH 1 INPUT	In	3.3V	<1A	SW3.P1
2	SWITCH ON OFF INPUT	In	3.3V	<1A	SW3.P2
3	SWITCH 2 INPUT	In	3.3V	<1A	SW3.P3
4	P4	Out	0V	<1A	GND

<i>J6 LED PANEL: JST B4B-EH-A (4 ways, vertical)</i>					
<i>PIN</i>	<i>Description</i>	<i>in/out</i>	<i>V ref.</i>	<i>I max.</i>	<i>Connected to</i>
1	GND	Out	0V	<1A	EB2.GND
2	LED1	Out	3.3V	<1A	EB2.LD1
3	LED2	Out	3.3V	<1A	EB2.LD2
4	LED3	Out	3.3V	<1A	EB2.LD3

<i>J10 TC1: JST B6B-EH-A (6 ways, vertical)</i>					
<i>PIN</i>	<i>Description</i>	<i>in/out</i>	<i>V ref.</i>	<i>I max.</i>	<i>Connected to</i>
1	Vbatt +	Out	24V	<1A	TC1.B+
2	TC1 key switch	Out	24V	<1A	TC1.Key switch
3	Battery ON/OFF	Out	0-5V	<1A	TC1.BAT WKP
4	CAN H	Out	2.5V	<1A	TC1.CANH
5	CAN L	Out	2.5V	<1A	TC1.CANL
6	Vbatt -	Out	0V	<1A	TC1.GND

<i>J11 COMBAT2 : JST B4B-EH-A (4 ways, vertical)</i>					
<i>PIN</i>	<i>Description</i>	<i>in/out</i>	<i>V ref.</i>	<i>I max.</i>	<i>Connected to</i>
1	Battery ON/OFF	Out	24V	<1A	BAT1.ON OFF
2	CAN H	In-out	2.5V	<1A	BAT1.CANH
3	CAN L	In-out	2.5V	<1A	BAT1.CANL
4	GND	Out	0V	<1A	BAT1.GND

<i>J14 OUT1: type FCI T702035100J0G <sup>(1)</sup> (2 ways, screw type)</i>					
<i>PIN</i>	<i>Description</i>	<i>in/out</i>	<i>V ref.</i>	<i>I max.</i>	<i>Connected to</i>
1	Brush output +	Out	20V	25A	M1+
2	Brush output -	Out	0V	25A	M1-

<i>J17 OUT2: type FCI T702035100J0G <sup>(1)</sup> (2 ways, screw type)</i>					
<i>PIN</i>	<i>Description</i>	<i>in/out</i>	<i>V ref.</i>	<i>I max.</i>	<i>Connected to</i>
1	Vacuum output +	Out	20V	25A	M2+
2	Vacuum output -	Out	0V	25A	M2-

<sup>1</sup> Alternative: Amphenol KP02215000J0G

<i>J20 AUX1: type JST B2P-VH (2 ways, vertical)</i>					
<i>PIN</i>	<i>Description</i>	<i>in/out</i>	<i>V ref.</i>	<i>I max.</i>	<i>Connected to</i>
1	Solution valve output +	Out	12V	4A	EV1+
2	Solution valve output -	Out	0V	4A	EV1-

<i>J26 SWITCH DETECT : B4B-EH-A (4 ways, vertical)</i>					
<i>PIN</i>	<i>Description</i>	<i>in/out</i>	<i>V ref.</i>	<i>I max.</i>	<i>Connected to</i>
1	GND	/	0V	<1A	/
2	Brush EN SW	In	0 / 3.3V	<1A	SW2.+
3	Solution Level SW	In	0 / 3.3V	<1A	SW1.+
4	GND	/	0V	<1A	/

**EB1 (P27) FUSES (on EB1 side A)**

<i>Code</i>	<i>Description</i>	<i>Type</i>	<i>Rated</i>
F2	Low power circuits	PTC	0.2A
F4	Brush output fuse	LITTELFUSE ATOFUSE	30A
F5	Vacuum output fuse	LITTELFUSE ATOFUSE	30A

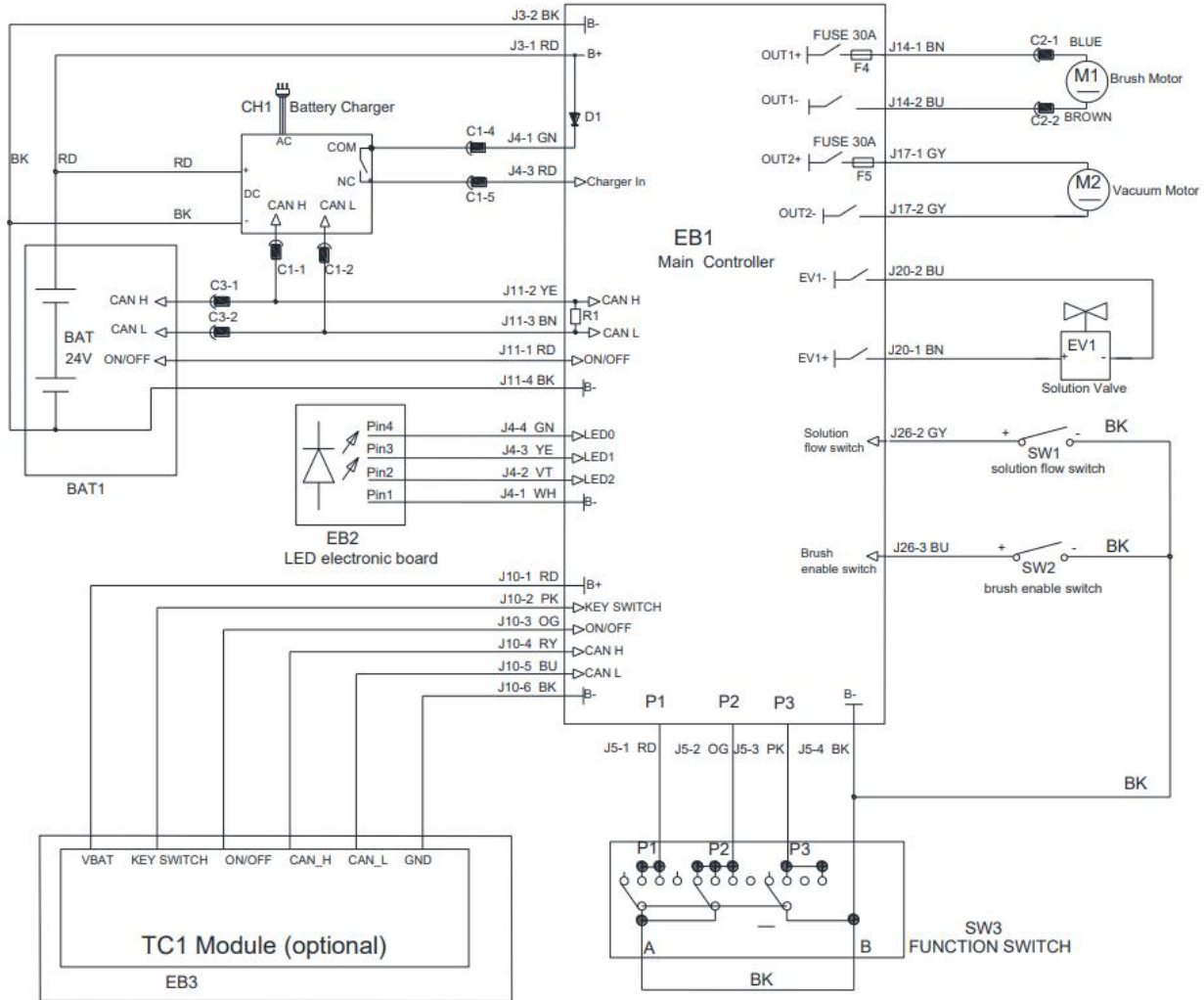
**Program selection knob/rotary switch (SW3)**

<i>Ref.</i>	<i>Machine Mode</i>
0	Off
P1	Scrubbing and drying program
P2	Scrubbing program
P3	Drying program

**EB2 (UI Delta10) LED PANEL (on EB2 side A)**

<i>Type SMD</i>		
<i>Ref.</i>	<i>Colour</i>	<i>Description</i>
GND	/	GND
LD1	Red	Battery level 1
LD2	Yellow	Battery level 2
LD3	Green	Battery level 3

WIRING DIAGRAM









P100406

FUNCTIONS

- a. Power supply and hardware protections architecture: Low power circuitry supply on input is permanently powered by B+. Directly connected to this input there is the fuse F2. The permanent supply outputs TC1 POWER.+ are directly connected to F3. High power outputs (BRUSH and VACUUM) take power from BATTERY. Only when the correct battery voltage polarity is detected from input BATTERY. Each high power output is protected by the safety fuses F4 (BRUSH) and F5 (VACUUM).
- b. The program selection knob/rotary switch (SW3) and the machine start-up enabling push-button (SW2) to enable the brush motor (M1), the vacuum system motor (M2) via main controller (EB1) and the solenoid valve (EV1). The Solution flow switch (SW1) to controller the water flow (2 levels). Diagram of Output Activation according to the Position of the Switches (SW1), (SW2) and (SW3) as below.

**Diagram of Output Activation according to the Position of the Switches (SW1), (SW2) and (SW3)**

Program selection knob/ rotary switch (SW3) settings	Machine start-up enabling push-button (SW2) settings (with brush activation levers)	Brush motor (M1)	Solenoid valve (EV1)	Vacuum system motor (M2)
	Pressed/released	Off	Off	Off
	Released	Off	Off	On
	Pressed	On	On	On
	Released	Off	Off	Off
	Pressed	On	On	Off
	Released/	Off	Off	On
	Pressed	On	Off	On

Solution flow push-button setting (SW1)	Symbols	Solenoid valve ON time (EV1)	Solenoid valve OFF time (EV1)
0		2 sec	2 sec
1		Always ON	-

The system functions are:

- BRUSH (see point c.)
- VACUUM (see point d.)
- SOLUTION FLOW (see point e.)
- BATTERY LEVEL (see point f.)
- TC1 MODULE INTERFACE (see point g.)
- HARDWARE PROTECTION: (see point h.)
- BLUETOOTH INTERFACE:(see point i.)

- c. BRUSH function: The brush motor (M1) is supplied by main controller(EB1) which is driven by the program selection knob/rotary switch (SW3) when it is turned to 1, 2 or 3, and the machine start-up enabling push-button (SW2) is pressed. The circuit is protected by the brush motor fuse (F4).The system, once activated, uses the solution coming from the solution system, to wash the floor.

The main controller can set the pwm (0-100%) to enable the brush output.

It is set as the constant 20V mode(5A),22V(5-10A), battery voltage(>10A) and with the soft start and shortcircuit protect functions.

To work properly, the brush motor needs the following:

- Program selection knob/rotary switch (SW3) turned to 1, 2 or 3
- Machine start-up enabling push-button (SW2) pressed
- Charged batteries (the red LED must not be flashing).

- d. VACUUM function: The vacuum motor (M2) is supplied by main controller (EB1) which is driven by the program selection knob/rotary switch (SW3) when it is turned to 1 or 3. The circuit is protected by the vacuum motor fuse (F5). The system, once activated, uses the solution coming from the solution system, to wash the floor.

The main controller can set the pwm (0-100%) to enable the brush output.

It is set as the constant 20V mode(5A),22V(5-10A), battery voltage(>10A) and with the soft start and shortcircuit protect functions.

The Vacuum Function enabling state as in the following table:

Vacuum mode	Target output voltage	Machine mode
OFF	0V	“0”
ON	“Vacuum Target Voltage”	“Drying”, “Scrubbing and Drying”

To work properly, the brush motor needs the following:







- Program selection knob/rotary switch (SW3) turned to 1 or 3
- Charged batteries (the red LED must not be flashing).

- e. SOLUTION FLOW function: The solution flows is adjusted by the solution flow switch (SW1). The water from the tank to the tap, through the filter and solenoid valve (EV1) and then to the brush deck.  
 The solenoid valve (EV1) is driven by the program selection knob/rotary switch (SW3) when it is turned to 1 or 2, and the machine start-up enabling push-button (SW2).  
 When the solution flow switch (SW3) is open the solenoid valve (EV) is driven by main control board (EB1) (2 sec. ON - 2 sec. OFF).  
 When the solution flow switch (SW1) is closed the solenoid valve (EV1) is always on. The solenoid valve (EV1) opening and closing time, according to the water flow, are shown below.

<i>flow rate set</i>	<i>Ton (sec.)</i>	<i>Toff (sec.)</i>
2 drops	Continuous	0
1 drop	2	2
0	0	Continuous

- f. BATTERY LEVEL function: the battery level is shown by 3 LEDs, that are light depending on the BAT1 voltage as described in the following table. Every 100ms update LED status.(DISCHARGE STATUS)

Green warning light - 10% <=100 %  
 Yellow warning light - 5% <=battery capacity <=10 %  
 Red warning light - battery capacity <5%

Battery charge level LED display		
		
		

When the battery charger is connected to the electrical mains, all machine functions are automatically cut off. (CHARGE STATUS)

During normal charging the Green Light is flashing until 90% of the capacity has been reached. The Green light turns constant On when the capacity is more than 90%.  
 The battery and charger will automatically turn Off 5 minutes after fully charged and the Green light will also turn Off.

- g. TC1 module INTERFACE: The main controller board(EB1) communicate with the TC1 module via CAN connector interfaces. When the battery is turn on , it supply the power to TC1 module. And them supply the KEY SWITCH power to activate the TC1 module, and supply the BATTERY WAKEUP to wakeup the li-ion battery in the module.  
 When the module is turn on and it will communicate with the main controller board(EB1) via CAN.  
 It will upload the machine's state information to the cloud.

- h. HARDWARE PROTECTION:

The board should work in a range of battery voltage from 18V to 32V.  
The board is protected from voltage peaks over than 51V by a TVS circuit.

- i. **BLUETOOTH INTERFACE:** The main control board (EB1) communicates with the BLE chip (DA14531) through the USART and enable Bluetooth function.  
The Bluetooth can use for SUOTA , get or set the status by mobile phone/ laptop.

## **GENERAL SPECIFICATION**

Pcb shows its P/N and lot or production date information on serigraphy or label.

Connector codes are visible on serigraphy near each component.

Pcb is UL recognized, flammability rated UL-V0 and marked accordingly.

Pcba is protected from moisture effects by coating.

Pcba should pass vibration tests according to EN60721-3-5 class 5M1.



## FCC Statement

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Important Note:

## Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Country Code selection feature to be disabled for products marketed to the US/Canada.

This device is intended only for OEM integrators under the following conditions:

1)The antenna must be installed such that 20 cm is maintained between the antenna and users, and for the P27 PCBA equipped the PCB antenna, the antenna gain is 4.91dBi

2)The transmitter module may not be co-located with any other transmitter or antenna,

As long as the above conditions are met, further transmitter testing will not be required.

However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

## Important Note:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator

will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

## End Product Labeling

The final end product must be labeled in a visible area with the following" Contains FCC ID: 2AVNE-AW2".

## Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

## Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

## ISED Statement

- English: This device complies with Industry Canada license - exempt RSS standard(s).

Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) This device must accept any interference, including interference that may cause undesired operation of the device.

The digital apparatus complies with Canadian CAN ICES - 3 (B)/NMB - 3(B).

- French:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

## Radiation Exposure Statement

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Déclaration d'exposition aux radiations

Cet équipement est conforme Canada limites d'exposition aux radiations dans un environnement non contrôlé. Cet équipement doit être installé et utilisé à distance minimum de 20cm entre le radiateur et votre corps.

This device is intended only for OEM integrators under the following condition:

The transmitter module may not be co-located with any other transmitter or antenna.

As long as the condition above is met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed.

Cet appareil est conçu uniquement pour les intégrateurs OEM dans les conditions suivantes: Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

Tant que les 1 condition ci-dessus sont remplies, des essais supplémentaires sur l'émetteur ne seront pas nécessaires. Toutefois, l'intégrateur OEM est toujours responsable des essais sur son produit final pour toutes exigences de conformité supplémentaires requis pour ce module installé.

## Important Note:

In the event that these conditions cannot be met (for example certain laptop configurations or co-location with another transmitter), then the Canada authorization is no longer considered valid and the IC cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate Canada authorization.

Note Importante:

Dans le cas où ces conditions ne peuvent être satisfaites (par exemple pour certaines configurations d'ordinateur portable ou de certaines co-localisation avec un autre émetteur), l'autorisation du Canada n'est plus considéré comme valide et l' IC ne peut pas être utilisé sur le produit final. Dans ces circonstances, l'intégrateur OEM sera chargé de réévaluer le produit final (y compris l'émetteur) et l'obtention d'une autorisation distincte au Canada.

## End Product Labeling

The final end product must be labeled in a visible area with the following: Contains IC: 25476-AW2.

Plaque signalétique du produit final

Le produit final doit être étiqueté dans un endroit visible avec l'inscription suivante: Contient des IC: 25476-AW2

## Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.

Manuel d'information à l'utilisateur final

L'intégrateur OEM doit être conscient de ne pas fournir des informations à l'utilisateur final quant à la façon d'installer ou de supprimer ce module RF dans le manuel de l'utilisateur du produit final qui intègre ce module.

Le manuel de l'utilisateur final doit inclure toutes les informations réglementaires requises et avertissements comme indiqué dans ce manuel.