DAC eco M-Type

Instructions for use

IMPORTANT:

READ CAREFULLY BEFORE USE

KEEP FOR LATER REFERENCE

1 About these instructions

These instructions for the **DAC eco M-Type** controller were compiled with the utmost care. They contain information and notes to enable long-term and reliable operation.

Should you notice any discrepancies or if you have improvement requests, we would be glad to receive your feedback through Customer service (📖 *S. 30*).

Consider these instructions part of the product and keep it on hand at all times.

1.1 Target group of these instructions

These instructions are intended for:

- Operating personnel:
  This group is familiar with the controller and has access to the instructions for use.
  Specifically, chapter *Operation* (📖 *S. 17*) is important for this group of employees.
- Technicians:
  This group has the appropriate technical training for performing maintenance or repairing malfunctions.
  Specifically, chapter *Programming* (📖 *S. 20*) is important for this group of employees.

With regard to minimum qualification and other requirements to be met by personnel, please also follow chapter *Safety* (📖 *S. 9*).

1.2 Representation conventions – symbols and characters

Various information in these instruction is represented or highlighted by the following characters in order to facilitate easy and quick understanding:

Proper setting

Indicates proper setting.

Malfunctions

Specifies the faults that can occur due to an incorrect setting.

Cover

Specifies which covers have to be removed in order to access the components to be set.

Steps to be performed when operating the machine (sewing and equipping)

Steps to be performed for service, maintenance, and installation

Steps to be performed via the software control panel

The individual steps are numbered:

1. 1. First step
2. 2. Second step

etc. The sequence of the steps must always be followed.

- Lists are identified by bullet points.

Result of performing an operation

Change to the machine or on the display/control panel.

Important

Special attention must be paid to this point when performing a step.

Information

Additional information, e.g. on alternative operating options.

Order

Specifies the work to be performed before or after a setting.

References

Reference to another section in the instructions.

Safety Important warnings for the machine operator are specially designated. Since safety is of particular importance, hazard symbols, levels of danger and their signal words are described separately in the chapter *Safety* (📖 *S. 9*).

Orientation If the figure is unclear, indications of **right** or **left** are always from the operator's point of view.

1.3 Other documents

The controller includes components from other manufacturers. Each manufacturer has performed a hazard assessment for these purchased parts and confirmed their design compliance with applicable European and national regulations. The proper use of these components is described in each manufacturer's instructions.

1.4 Liability

All information in these instructions were compiled with consideration to the state of the art, and applicable standards and regulations.

Dürkopp Adler cannot be held liable for damages resulting from:

- Breakage and transport damages
- Failure to follow the instructions provided
- Improper use
- Unauthorized modifications to the controller
- Use of untrained personnel
- Use of unapproved replacement parts

Transport

Dürkopp Adler will not be held liable for any damage during transport. Inspect the delivery immediately upon receiving it. Report any damage to the last transport manager. This applies even if the packaging is undamaged.

Leave controllers, equipment and packaging material in the condition in which they were found when the damage was discovered. This will ensure any claims against the transport company.

Report all other complaints to Dürkopp Adler immediately after receiving the product.

2 Performance description

2.1 Characteristics

- Positioning drive for M-Type sewing motor
- Integration in the machine head of the M-Type
- Programmable parameters
- Transfer of machine-specific parameters during start-up directly from the machine identification memory (machine ID) of the machine

2.2 Declaration of conformity

The **DAC eco M-Type** complies with European regulations ensuring health, safety, and environmental protection as specified in the declaration of conformity or low voltage directive.

CE

2.3 Technical data

Rating and usage conditions

Data / motor type	Unit	Built-in motor
Rating		
Line voltage	[V]	190 – 250, single phase
Line frequency	[Hz]	50/60
Rated power	[W]	600
Speed of the motor	[min^{-1}]	3400

Data / motor type	Unit	Built-in motor
Operating mode	S5 (Intermittent periodic duty with electric braking, relative duty cycle 40%, length 2.5 s)	
IP class	IP40	
Insulation class	E	
Usage conditions		
Ambient temperature	[°C]	+ 5 – 50

3 Safety

This chapter contains basic information for your safety. Read the instructions carefully before setting up or operating the controller. Make sure to follow the information included in this chapter. Failure to do so can result in serious injury and damage to the machine.

3.1 Basic safety instructions

The **DAC eco M-Type** controller may only be used as described in these instructions.

The instructions should be available at the controller's location at all times.

Work on live components is prohibited.

The controller was built and tested in compliance with all valid ordinance and safety regulations, and left the factory in proper working order.

The controller will only work safely and reliably when it is used as intended (📖 *4.3 Proper use*, S. 15).

Before leaving the workplace:

- Switch off the controller
- Wait until the machine stops
- Wait until the LEDs go out

Obligations of the operator

Observe the country-specific safety and accident prevention regulations and the legal regulations concerning industrial safety and the protection of the environment.

All warnings and safety signs on the controller must always be in legible condition and may not be removed. Missing or damaged labels should be replaced immediately.

Requirements to be met by the personnel

The controller may only be set up by qualified technicians. Qualified technicians are personnel with electronics and mechanical training.

The following work may only be performed by qualified technicians.

- Maintenance work
- Repairs
- Work on electrical equipment

Only authorized persons may work on the machine. Anyone working on the machine belongs to the operating personnel. Operating personnel must have read and understand the instructions before working on the system.

Setup Controller setup and start-up must be performed carefully by qualified technicians to ensure no health risks for operating personnel.

The power cable must have a plug authorized for the country in which the machine is being used. The power plug may only be connected to the power cable by a qualified specialist.

Operation Inspect the controller while in use for any externally visible damage.

Stop working if you notice any changes. Report any changes to your supervisor.

A damaged controller should no longer be used.

Conversions or changes to the controller are prohibited.

3.2 Signal words and symbols used in warnings

Warnings in the text are distinguished by color bars. The color scheme is oriented towards the severity of the danger. Signal words indicate the degree of risk:

Signal words Signal words and the hazard that they describe:

Signal word	Hazard
WARNING	Performing an action can have serious or hazardous consequences.
CAUTION	Performing an action can have undesirable consequences, such as loss of data or damage to hardware.
NOTE	Tips or more detailed information to make operation easier for the user.

Symbols The following symbols indicate the type of risk to personnel:

Symbol	Type of danger
	General risk
	Electric shock
	Puncturing
	Crushing
	Environmental damage

Examples **Examples of the layout of the warnings in the text:**

WARNING

Type and source of risk

Consequences of non-compliance.

Measures for avoiding the risk.

↳ This is what a warning looks like where non-compliance could result in serious or hazardous consequences.

CAUTION

Type and source of risk

Consequences of non-compliance.

Measures for avoiding the risk.

↳ This is what a warning looks like where non-compliance could result undesirable consequences, such as loss of data or damage to hardware.

NOTE

Tip.

↳ This is the more detailed information to simplify operation for the user.

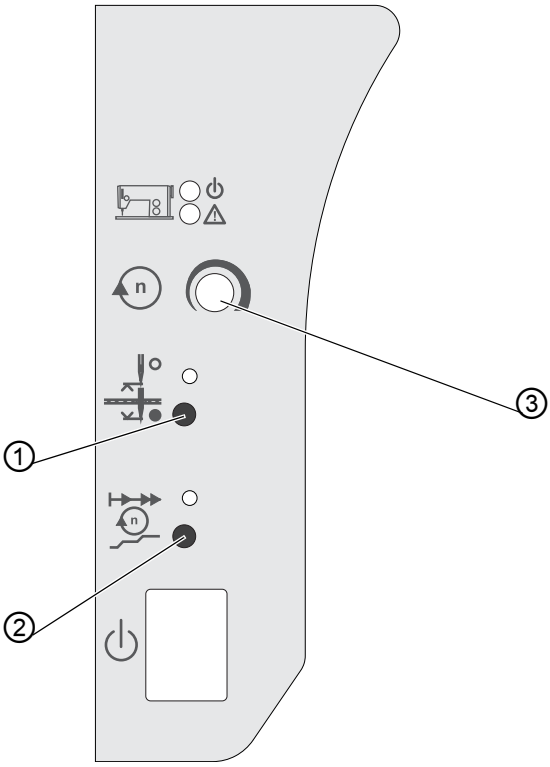
4 Components and functions

When delivered the **DAC eco M-Type** consists of:

- Foot pedal rods
- Setpoint device
- Controller

4.1 Controller

Fig. 1: Controller front



*(1) - Button **S1***
*(2) - Button **S2***
(3) - Potentiometer

Buttons and functions

No.	Button	Function	Reference
①	**S1**	Sewing mode • Select needle stop position Programming mode • Confirm input • Increase values	🕮 *S. 19*
②	**S2**	Sewing mode • Switch on soft start Programming mode • Terminate input • Reduce values	🕮 *S. 19*
③	**Potentiometer**	• Adapt maximum speed	🕮 *S. 20*

4.2 Setpoint device

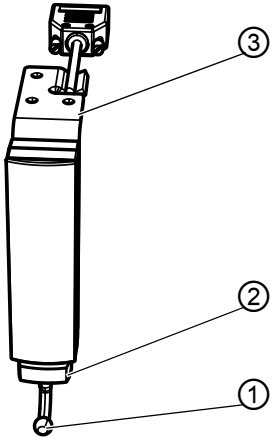
The setpoint device converts the values from the foot pedal into voltage values. The setpoint device indicates the speed.

The setpoint device is attached under the frame with a mounting bracket.

The setpoint device includes:

- a push/pull rod (1) that is connected to the machine foot pedal through the set of rods.
- a spring preload (2), enabling 3 settings for the push/pull rod (none, 1/8, or 1/4 rotation)

Fig. 2: Setpoint device



(1) - Push/pull rod
(2) - Spring pre-load
(3) - Mounting parts

4.3 Proper use

The **DAC eco M-Type** controller is not a standalone unit; instead, it is intended for installation in a machine of the class **M-Type** with the subclass' suffix M. For additional information refer to
📖 *2.2 Declaration of conformity*, S. 7.

The controller is intended for industrial use.

The controller may only operate in rooms that are clean and dry.

Do not operate the controller when aerosols (sprays) or oxygen is in use.

Proper use includes compliance with the operating, maintenance, and repair conditions as specified by the manufacturer.

Only authorized persons may work on the controller (chapter
📖 *3 Safety*, S. 9).

CAUTION

Improper use can result in hardware damage.

Follow all instructions provided.

5 Operation

Operation of the **DAC eco M-Type** controller is provided exclusively by using buttons **S1** and **S2** as well as the potentiometer.

You set the foundation for the sewing process with the settings on the controller.

5.1 Initial start-up

Before initial start-up of the controller, make sure to follow all information in chapter 🕮 *3 Safety*, S. 9.

CAUTION

Hardware damage due to faulty connection.

An overload is possible due to a faulty connection.

Only qualified technicians may perform the connection.

Ensure the following:

- Setting the positions (🕮 *S. 24*)

5.2 Basic operation

In this section you will learn the basics for working with the controller. These basics are:

- Switching the controller on and off (🕮 *S. 17*)
- Using buttons (🕮 *S. 19*)
- Using the potentiometer (🕮 *S. 20*)

5.2.1 Switching the controller on and off

Important

Before operating the controller, make sure to follow all information in chapter 🕮 *3 Safety*, S. 9.

WARNING

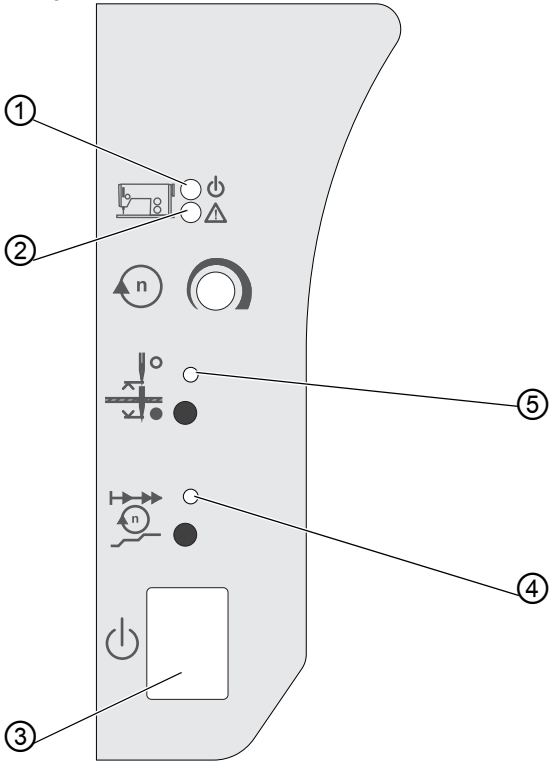
Risk of injury by the needle tip.

Accidentally switching on the system may result in minor puncture injuries.

When there are longer standstill periods, disconnect the power cable before leaving the workplace.

The controller is located below the tabletop of the frame.

Fig. 3: Switching the controller on and off



(1) - POWER-LED
(2) - MESSAGE-LED
(3) - Main switch
*(4) - LED **S2***
*(5) - LED **S1***

Switching on the controller

1. Press the main switch (3) down to position I.

↳ The POWER LED (1) illuminates green.

You can begin sewing and pushing the foot pedal forward.

Switching off the controller

When you are finished your work switch off the controller.

1. Press the main switch (3) up to position 0.

↳ The MESSAGE LED (2) illuminates red.

5.2.2 Using buttons

While in sewing mode, you can select the following machine functions with the buttons:

Buttons and use

Button	Use
S1	• Select needle stop position: up = LED illuminates down = LED off
S2	• Switch on soft start

To select a machine function:

1. Briefly press the corresponding button.

↳ The machine beeps briefly.
You will recognize whether a machine function has been activated by the LED in the respective button.

When the POWER LED is on you can sew. Programming is possible outside of sewing only (📖 *S. 20*).

5.2.3 Using the potentiometer

You can use the potentiometer to adjust the maximum speed of the current sewing process. The set values are retained, even when you switch off the controller.

To adjust the maximum speed:

1. Turn the potentiometer:
   - Clockwise = increase speed
   - Counterclockwise = decrease speed

5.3 Programming

You can program the controller within a reduced scope using buttons **S1** and **S2**.

Buttons and use

Button	Use
S1	• Confirm input (press and hold) • Increase values (press briefly)
S2	• Terminate input (press and hold) • Reduce values (press briefly)

Programmable parameters

No.	Parameters	Min.	Max.	Flashing LED S1 ≙	Flashing LED S2 ≙	Unit
1	Soft start stitch count	1	20	10	1	
2	Soft start speed	100	1000	100		[rpm]
3	Max. speed	100	3400	1000	100	[rpm]
4	Holding force	0	6	0.1	1	[A]
5	Needle position					

Important

The programming mode has to be activated first.

To activate the programming mode:

1. When switching on the controller press and hold button **S1** until the machine beeps a second time.

↳ The MESSAGE LED flashes.

Select the corresponding parameter by briefly pressing button **S1**. The **S1** LED indicates which parameter has been preselected through frequent flashing.

5.3.1 Setting the soft start stitch count

Soft start refers to starting the machine at a slower speed. This machine function prevents the motor from overheating during long work processes. After a certain stitch count, the machine runs at the set soft start speed (📖 *S. 22*).

You set the stitch count for soft start as follows:

1. Briefly press button **S1** once.

↳ LED **S1** flashes briefly once.

2. Press and hold button **S1**.

↳ The MESSAGE LED illuminates.

3. Press button **S1** repeatedly until the required value is obtained.
   You can reduce the value by briefly pressing button **S2**.

↳ The value increases or decreases incrementally by one step.
LED **S1** flashes for the tens digit, and LED **S2** for the units digit.

4. Press and hold button **S1** to confirm input.

Press and hold button **S2** to return to sewing mode.

5.3.2 Setting the speed

You can also set the speed for soft start.

To set the soft start speed:

1. Briefly press button **S1** twice.

↳ LED **S1** flashes briefly twice.

2. Press and hold button **S1**.

↳ The MESSAGE LED illuminates.

3. Press button **S1** repeatedly until the required value is obtained.
   You can reduce the value by briefly pressing button **S2**.

↳ The value increases or decreases incrementally by one one-hundredth step.
LED **S1** flashes for the hundreds digit, and LED **S2** for the units digit.

4. Press and hold button **S1** to confirm input.

Press and hold button **S2** to return to sewing mode.

5.3.3 Set maximum speed

A reduced speed protects the sewing motor with an ongoing lower speed. The maximum speed depends on the machine class.

To set the speed:

1. Briefly press button **S1** three times.

↳ LED **S1** flashes briefly three times.

2. Press and hold button **S1**.

↳ The MESSAGE LED illuminates.

3. Press button **S1** repeatedly until the required value is obtained.
   You can reduce the value by briefly pressing button **S2**.

↳ The value increases or decreases incrementally by one one-hundredth step.
LED **S1** flashes for the thousands digit, and LED **S2** for the hundreds digit.

4. Press and hold button **S1** to confirm input.

Press and hold button **S2** to return to sewing mode.

Example for setting the speed

The value is set by pressing the button (button **S1** or button **S2**). The following example assumes an initial value of 3400 rpm :

To set the speed to 1700 rpm (**=** 3400 - 1700):

1. Briefly press button **S2** 17 times (≙ 1700 / 100).

↳ LED **S1** flashes once, LED **S2** 7 times.

2. Press and hold button **S1** to confirm input.

5.3.4 Setting the holding force

This function prevents unintended needle movement when the machine is stopped. You can check whether it is working by turning the handwheel.

Holding force works when the machine is stopped:

- when stopping during sewing
- at the end of sewing

The effect can be adjusted.

CAUTION

Hardware damage due to incorrect setting.

Setting too strong a holding force can overheat the sewing motor.

Only qualified technicians may make this setting.

To set the holding force:

1. Briefly press button **S1** four times.

↳ LED **S1** flashes briefly four times.

2. Press and hold button **S1**.

↳ The MESSAGE LED illuminates.

3. Press button **S1** repeatedly until the required holding force is obtained.

You can reduce the holding force by briefly pressing button **S2**.

↳ The holding force increases or decreases in increments of 0.5 A.
LED **S1** flashes for the digit before the decimal point, and LED **S2** for the decimal digit.
The higher the set value, the stronger the holding force.

4. Press and hold button **S1** to confirm input.

5.3.5 Setting positions

The following positions can be set:

- Reference position
- Position 1
- Position 2

The positions have to be set once:

- during initial start-up (📖 *S. 17*)
- after replacing the controller
- after replacing the motor or setpoint device

Setting the reference position

The reference position establishes a reference between the synchronizer and the actual mechanical position.

CAUTION

Hardware damage due to incorrect setting.

An incorrect setting can cause problems in the sewing process.

Only qualified technicians may make this setting.

To set the reference position:

1. Briefly press button **S1** five times.

↳ LED **S1** flashes briefly five times.

2. Press and hold button **S1**.

↳ The MESSAGE LED, LED **S1**, and LED **S2** illuminate.

WARNING

Risk of injury by the needle tip.

Accidentally pressing the foot pedal may result in minor puncture injuries.

Secure the sewing area.

3. Press the foot pedal forward.

↳ LEDs **S1** and **S2** flash.

4. Turn the handwheel until the needle tip is on the throat plate.

5. Press and hold button **S1** to confirm input.

↳ LED **S2** flashes.

Either continue by setting position 1 or exit the parameter while keeping button **S2** pressed.

Setting the position 1

Position 1 (lower dead center) indicates the position where it needle is at its lowest point.

To set the position 1:

1. Turn handwheel until the needle below changes direction.

2. Press and hold button **S1** to confirm input.

↳ LED S1 flashes.

Either continue by setting position 2 or exit the parameter while keeping button **S2** pressed.

Setting the position 2

Position 2 (upper dead center) indicates the position where it needle is at its highest point.

To set the position 2:

1. Turn handwheel until the needle above changes direction.

2. Press and hold button **S1** to confirm input.

Press and hold button **S2** to return to sewing mode.

6 Electrical connection

WARNING

Electric shock due to live parts.
Serious or fatal injuries possible.
Work on the electrical system must ONLY be performed by technicians or appropriately trained and authorized personnel.

6.1 Connecting the power supply

1. Connect the controller to grounded AC line power per the wiring diagram (📖 *9 Appendix*, S. 35). Always use a multi-prong plug with protective ground contact.
   The following are suitable power supply nets:
   - TN net
   - TT net
   - IT net

7 Troubleshooting

7.1 Customer service

Contact for problems, repairs, or if the controller is damaged:

Dürkopp Adler GmbH
Potsdamer Str. 190
33719 Bielefeld, Germany
Tel: +49 (0) 180 5 383 756
Fax: +49 (0) 521 925 2594
E-Mail: service@duerkopp-adler.com
Internet: www.duerkopp-adler.com

7.2 Error messages

The **DAC eco M-Type** controller has 3 types of error messages displayed with the MESSAGE LED. The codes are displayed by means of the MESSAGE LED flashing for an appropriate period at specific intervals. After a brief pause the flashing repeats.

Types of error messages

Type	Description	Remedial action
Error	Serious error: Work cannot be continued	• Switch off the controller • Correct the state that resulted in the error • If nec., contact customer service
Warning	Error Work cannot be continued	• Correct the state that resulted in the error
Information	Information: Work can be continued	• Switch the controller off and on again • If nec., correct the state that resulted in the message

Listing of codes

Code	Type	Description	Remedial action
1	Warning	Operation lock	• Check tilt sensor on machine
2	Information	Low voltage warning (1st threshold): Live voltage < 180 V AC	• Check the line voltage • Stabilize the line voltage • Use generator
3	Warning	Foot pedal not in 0 position	• Remove foot from foot pedal
4	Error	Foot pedal not connected	• Connect foot pedal
5	Error	Sewing motor encoder plug (sub D, 9 pin) is not connected	• Connect encoder cable to the control system, use the correct connector
6	Error	Sewing motor blocked	• Eliminate stiff movement in the machine
7	Error	Sewing motor overload	• Eliminate stiff movement in the machine

Code	Type	Description	Remedial action
8	Error	Sewing motor not connected	• Check the connection • Test sewing motor phases (R = 2.8 Ω, high impedance to PE) • Replace sewing motor • Replace controller
9	Error	Sewing motor insulation error	• Check motor phase and PE for low-impedance connection • Replace sewing motor
10	Error	High-voltage error: Live voltage for extended period > 290 V	• Check line voltage, if line voltage exceeds continuously: • Stabilize or use generator
11	Error	EEprom communication error	• Check machine ID connection • Switch off the controller, wait until the LEDs are off and then switch on again
12	Information	No valid data on external EEprom	• Check machine ID connection • Switch off the controller, wait until the LEDs are off and then switch on again • Update the software
13	Error	Low voltage warning (2nd threshold): Live voltage < 150 V AC	• Check the line voltage • Stabilize the line voltage • Use generator

Code	Type	Description	Remedial action
14	Error	Incorrect sewing motor direction of rotation	• Exchange encoder • Check motor plug assignment and change, if necessary • Check wiring on machine distributor and change if necessary • Test motor phases and check for correct value
15	Error	Sewing motor overcurrent: Internal current rise > 25 A	• Replace controller
16	Error	Maximum speed exceeded	• Replace encoder
17	Error	AC-RDY Timeout: intermediate circuit voltage did not reach the defined threshold in the specified time	• Check the line voltage • If the line voltage is OK, replace the controller
18	Information	No valid data on external EEprom	• Check machine ID connection • Switch off the controller, wait until the LEDs are off and then switch on again • Update the software
19	Information	No valid data on external EEprom	• Check machine ID connection • Switch off the controller, wait until the LEDs are off and then switch on again • Update the software

8 Glossary

Term	Explanation
Machine function	Identifies an equipment feature of a machine
Parameters	Numerical values that activate or set a machine function
Potentiometer	Continuous adjustment wheel for setting the maximum speed
Soft start	Machine starts at a lower speed
Setpoint device	Converts the values from the foot pedal into voltage values
Stitch count	Indicates the number of stitches per minute

9 Appendix

Fig. 4: TN net wiring diagram

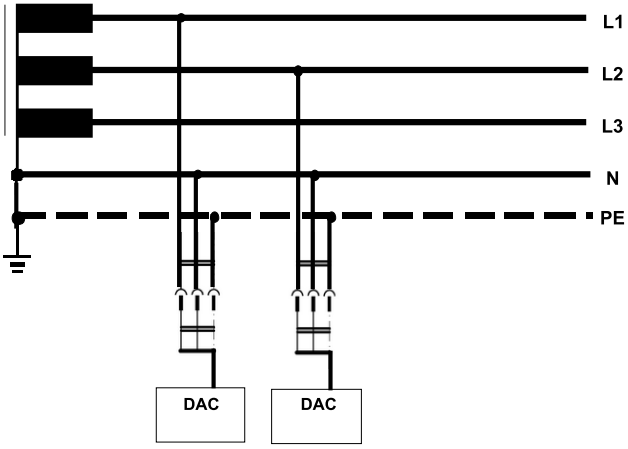


Fig. 5: TT net wiring diagram

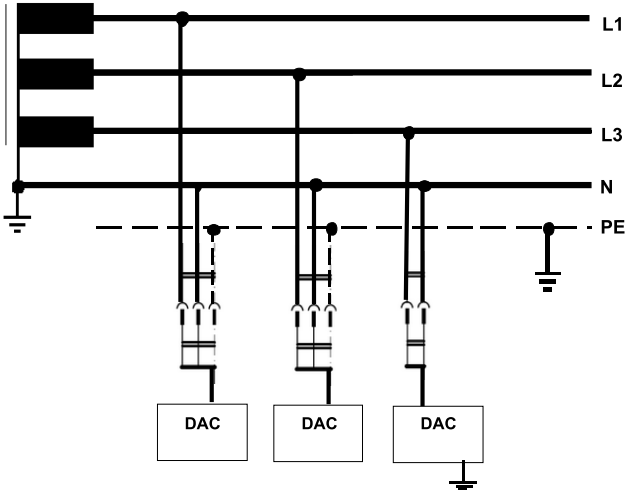
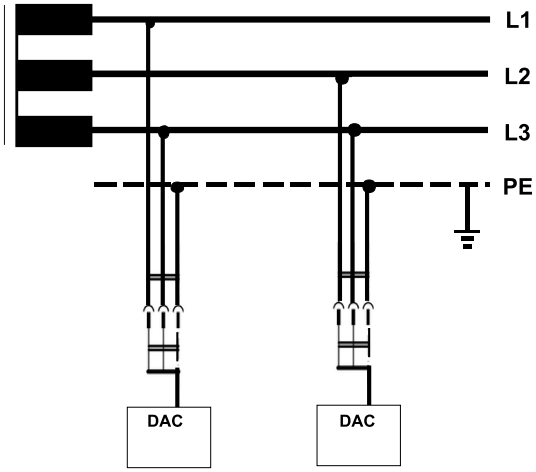


Fig. 6: IT net wiring diagram



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