

OPERATING INSTRUCTIONS

EC-Swap

Control converter for EC motors

Installation, commissioning and maintenance

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1. Preface

1.1. General information

The EC-Swap is a Wellset multifunction control device manufactured by Workswell Sàrl. It is integrated into control solutions for ventilation systems. These operating instructions describe all phases of the product life cycle and the persons who work on the product.

Although this documentation has been prepared with care, it may not always correspond to the performance data, standards or other characteristics, owing to periodic revisions of the product described. Workswell Sàrl reserves the right to revise and modify the documentation at any time without notice. No claims regarding the modification of products already supplied can be made on the basis of the data, diagrams and descriptions contained in this documentation. Only the product characteristics specified in the current version of these instructions are valid. Additional information provided on the product pages of the Wellset website or in other publications is not authoritative. All components and all hardware and software configurations supplied are suitable for the application. Modifications of hardware or software configurations other than those described in the documentation are not permitted and void the liability of Workswell Sàrl.

Before using the product, read these instructions carefully and in full. Understanding the information provided is essential for safe and efficient operation. Failure to observe the instructions and safety notes may result in injury, damage to the product or voiding of the warranty. Keep these instructions close at hand so that they can be consulted during operation and maintenance.

1.2. Warranty

For any information regarding the warranty, please contact your dealer or Workswell Sàrl. Using the equipment without complying with the conditions set out in this document may result in property damage, injury or death; it also voids the warranty.

1.3. CE conformity

This product complies with European regulations and bears the CE marking. The requirements for safety, health and environmental protection are met. For more information on the directives and standards applied, refer to the declaration of conformity (chapter 12).

1.4. Copyright

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1.5. Online version

An up-to-date online version of this document is available on the product page:

<https://www.wellset.ch/en/produits/ec-swap>

2. General

2.1. Document revisions

The operating instructions replace the EC-Swap installer documentation (v1.5); the history below is common to both documents.

Version	Date	Description
1.0	19.02.2026	Initial version.
1.1	16.06.2026	Technical additions and wiring diagrams.
1.2	03.08.2026	Layout according to the Wellset corporate design; brand references, product reference and contact details updated.
1.3	10.08.2026	Marking table corrected (section 6.1): functions of terminal blocks J1 and J2 restored. Wiring diagram added.
1.4	27.09.2026	Maximum current corrected: 16 A instead of 10 A. Connection of the LS/HS supply according to the wiring diagram, one pole per contactor.
1.5	28.09.2026	EC motor supply output permanently live, via U1, V1 and W2; the LS or HS command only controls the enable (D1) and the 0-10 V setpoint (E1).
1.6	01.10.2026	Operating instructions according to the Wellset corporate design. Operating principle and cabinet modification described according to the reference wiring, with the voltage monitoring relay -A1 (RM22TU23); marking table J1 to J9 and pin assignments of ports J3, J9 and J4 corrected; commissioning sequence revised; three fuse holders; silkscreen marking (J4, J5, J6) and rating plate according to the series device; drilling template according to the 3D model; signal words according to ISO 3864-2; elements of the declaration of conformity. <u>[DRAFT: points to be confirmed are marked in red]</u>
1.7	05.10.2026	EU declaration of conformity of 05.10.2026 included in chapter 12 (standards, place, date and signatory confirmed); chapter 12 restored in the published version.

Version	Date	Description
1.8	22.10.2026	Open points resolved according to the manufacturer: position of the rating plate, overvoltage category II, cable glands (2 × M32, 1 × M25), duplicated terminals of J2 (connection of a 400 V transformer), MODE jumpers in POT position, setting of -A1 at commissioning, 0 to 100 scale = 0 to 10 V setpoint; obsolete notes removed (1.5, 2.1). Still to be confirmed: weight.

2.2. Reading the instructions

The safety instructions are an integral part of these operating instructions; the risks are detailed in the corresponding sections. Failure to observe the manufacturer's specifications and improper use of the product may result in hazards. If you have any difficulty during operation or maintenance, please contact Wellset customer service (chapter 11).

These instructions must be read carefully and followed.

2.3. Device information

The rating plate (Figure 1), affixed to the enclosure, shows the manufacturer and its address, the designation (EC-Swap) and the reference (P/N WW-EC-SWAP-1), the supply ratings (3 × 400 VAC, 50 Hz, 16 A; 24 VDC, 25 mA), the degree of protection IP65, the date of manufacture (month/year), the CE marking, the safety symbols and the WEEE symbol. This information must be kept legible and must not be removed, concealed, or covered with glue or paint. The notes and safety symbols help prevent handling errors that could cause serious personal injury and property damage.

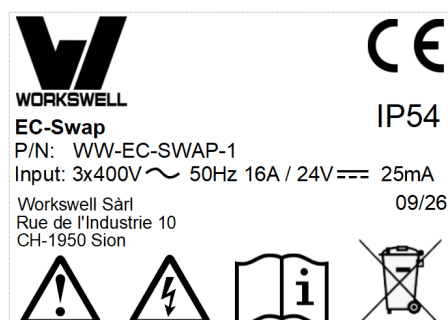


Figure 1: Rating plate (example: device manufactured in 09/26)

2.4. Marking

Symbol	Meaning
	The manufacturer declares that the product complies with the requirements of the applicable European legislation on health, safety and environmental protection (declaration of conformity, chapter 12).
	Alternating current.
	Direct current.
	Directive 2012/19/EU on waste electrical and electronic equipment (WEEE). Electronic equipment must not be disposed of with general household waste. Dispose of it at a designated collection point or contact your supplier for appropriate disposal instructions.

2.5. Safety symbols

Safety symbols on the rating plate:

Symbol	Meaning
	Risk of serious personal injury and property damage due to incorrect handling.
	Dangerous electrical voltage present.
	Read and understand these instructions in full, as well as those of the peripheral components.

2.6. Explanation of warning messages and safety instructions

The warnings and safety instructions in these instructions serve to protect persons against possible injury and the product against possible damage. The signal word indicates the level of risk, according to the grading of ISO 3864-2:

DANGER

Indicates an imminent hazardous situation.

If not avoided, it will result in death or serious injury.

- Action to be taken to avoid the hazard.

 WARNING

Indicates a potentially hazardous situation.

If not avoided, it could result in death or serious injury.

- Action to be taken to avoid the hazard.

 CAUTION

Indicates a potentially hazardous situation.

If not avoided, it could result in minor or moderate injury.

- Action to be taken to avoid the hazard.

NOTICE

Indicates a situation that could damage equipment.

If not avoided, it could result in damage to the device or its components.

- Action to be taken to avoid the damage.

IMPORTANT

Note, additional information, recommendation, reference, etc.

The warnings and safety instructions are an integral part of these instructions and must always be observed to ensure safe and correct use of the product.

2.7. Target group

This document provides detailed information and instructions to ensure that all users can use the device safely and efficiently. The information is intended for the following group of persons:

- **Technical professionals:** persons with the required qualification and basic knowledge of electrical engineering and mechanics, responsible for installing, operating and maintaining the device.

Irrespective of the respective qualification, only the activities specified in this document may be carried out.

All persons involved in commissioning, maintaining and repairing the device must be appropriately qualified and have knowledge of electrical installation. The definition of professional qualifications and their applicability are governed by national law.

2.8. Safety instructions and important information

DANGER

Do not work on live equipment!

Contact with live parts (400 V) will result in death or serious injury from electric shock or burns.

- Installation and removal must only be carried out by a qualified technician.
- Isolate and lock out all power supplies before any installation, connection, removal, repair or maintenance work.
- Only the tests and adjustments in chapter 7 are carried out live, under the conditions of the DANGER box in section 7.1.

WARNING

Cable sizing, damaged cables

An undersized or damaged cable can cause electric shock or fire and result in death or serious injury.

- Use cables with sufficient insulation and in good condition.
- Use cables with a cross-section suitable for the terminals and the currents to be carried.

WARNING

Conversion or modification of the device

A modification can remove the device's protection against electric shock and result in death or serious injury.

- Never modify or convert the device without the manufacturer's authorisation.
- Damaged components cannot be repaired and must be replaced with original components and parts.

WARNING

Misuse

Unintended use can make the device dangerous and result in death or serious injury.

- Only use the device for the purposes for which it was designed (see section 3.2).

IMPORTANT

Safety symbols are present on the device. They must always be observed. Their meaning is described in section 2.5.

IMPORTANT

Always follow the general and local regulations in force for accident prevention and environmental protection.

IMPORTANT

Read and follow all the recommendations in these instructions before installing or using the device.

3. EC-Swap

The EC-Swap is a module in an IP65 enclosure fitted with cable glands, designed to be inserted between the existing control cabinet and the EC motor of the ventilation system (Figure 2).

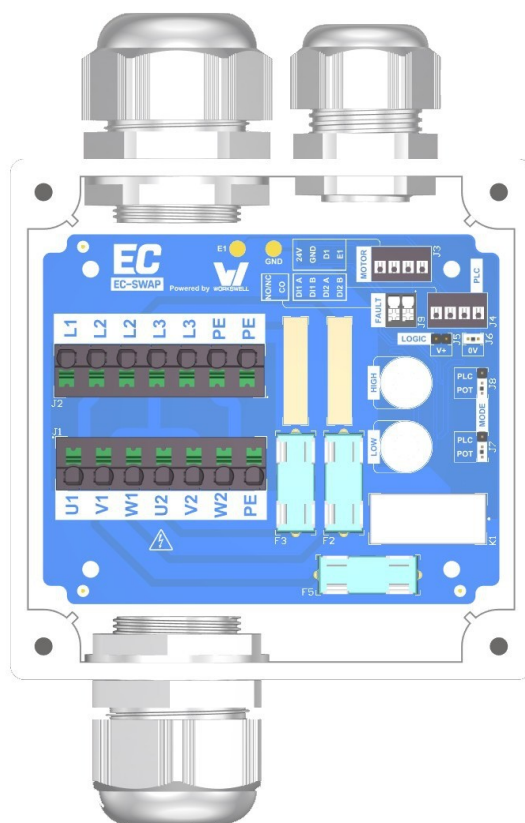


Figure 2: Overview of the EC-Swap, cover removed

3.1. Package contents

The EC-Swap package contains:

- the EC-Swap unit;
- the safety instructions (short version of these instructions).

3.2. Intended use

The EC-Swap is a multifunction control device designed for retrofitting ventilation systems. It allows a two-speed asynchronous motor (low speed LS and high speed HS) to be replaced by an electronically commutated (EC) motor while keeping the existing control cabinet: only the motor feeder is rewired there and supplemented by a voltage monitoring relay (chapter 5 and section 6.2). It is used to:

- detect the speed commanded by the existing cabinet (LS or HS) and control an EC motor accordingly, by means of an enable signal (D1) and a 0-10 V setpoint signal (E1);

- supply the EC motor with power (3 × 400 V three-phase) from the LS/HS supply input;
- adjust the speed levels associated with the LS and HS commands independently by means of two adjustment potentiometers marked LOW and HIGH;
- signal an EC motor fault to the cabinet or to a PLC: the EC-Swap then de-energises the V2 return, which is monitored in the cabinet by a three-phase voltage monitoring relay (section 3.3);
- in the EC-Swap PRO version, integrate air-quality control (CO₂ or VOC sensor) via an external PLC.

The EC-Swap must only be installed, commissioned and maintained by a qualified technician (section 2.7).

External devices may only be connected to the product if they comply with its specifications.

WARNING

Improper use

Any use other than that described above is improper: it can make the device dangerous and result in death or serious injury.

- Only use the EC-Swap under the conditions described in section 3.2.

3.3. Operating principle

In an original installation, the control cabinet directly supplies a two-speed asynchronous motor: the LS contactor supplies the low-speed windings (U1, V1, W1), the HS contactor the high-speed windings (U2, V2, W2). The EC-Swap is connected at the end of the old motor's cable (U1, V1, W1, U2, V2, W2, PE) and the EC motor is connected to its output J2; in the cabinet, only the motor feeder is rewired (chapter 5). The reference wiring is shown in Figure 7.

After adaptation, U1, V1 and W2 are permanently supplied by L1, L2 and L3, downstream of the circuit breaker; the LS contactor switches L3 to W1 and the HS contactor switches L1 to U2. The EC-Swap detects which of these two terminals is live and deduces the requested speed from it. It then enables the EC motor (output D1) and transmits the corresponding setpoint to it as a 0-10 V analogue signal (output E1). The setpoint levels associated with the LS and HS commands are set on two potentiometers marked LOW and HIGH.

The EC motor is supplied with 3 × 400 V by the motor output of the EC-Swap, connected to U1, V1 and W2: **it remains permanently live, even when stopped.**

In normal operation, terminal V2 is live (phase L2). If the EC motor develops a fault, the EC-Swap de-energises it: the three-phase voltage monitoring relay -A1 (Schneider RM22TU23), installed in the cabinet and connected to L1, V2 and L3, drops out and its changeover contact 11-12-14 signals the fault to the cabinet or to a PLC. The modernisation is thus carried out without replacing the control cabinet or reprogramming the existing automation system.

Figure 3 shows an example of integration, with one EC-Swap per motor.

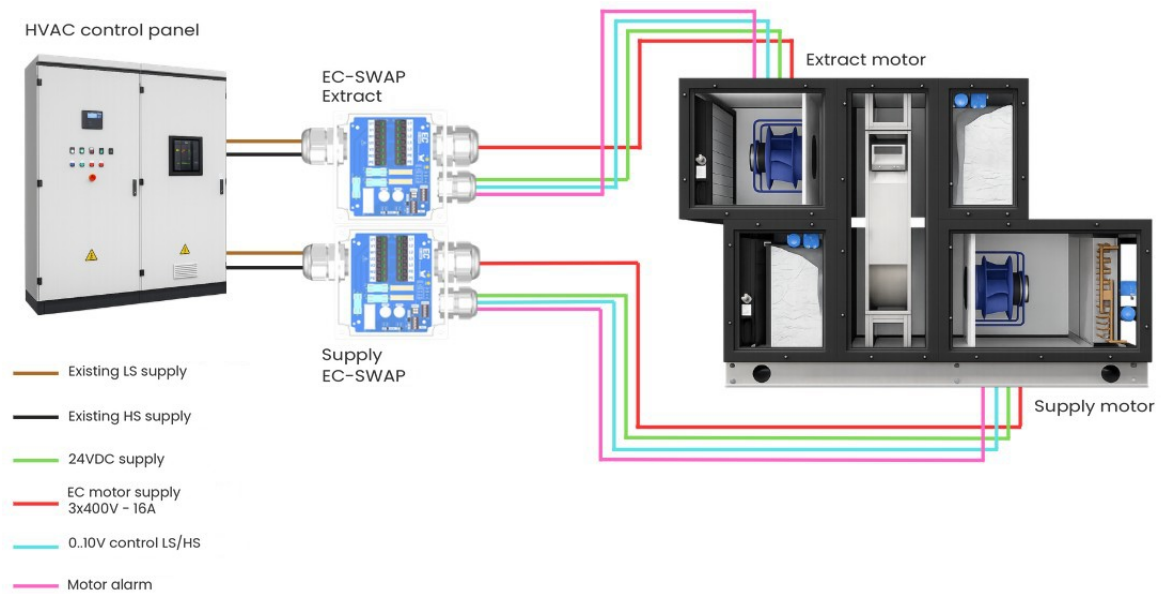


Figure 3: Example of integration with one EC-Swap per motor (extract and supply)

4. Choice of location and mounting

4.1. Choice of location

The EC-Swap is suitable for indoor mounting in a protected area. Its enclosure complies with degree of protection IP65 and is dust-tight and protected against water jets from all directions. The EC-Swap is only intended to be installed on a vertical, solid and flat surface. The environmental limits of use are specified in the following table:

Parameter	Value
Environment	Indoors, no direct exposure to sunlight
Temperature	0 to 45 °C
Relative humidity	< 80 % (non-condensing)
Altitude	2000 m max.
Overvoltage category	II
Pollution degree	2, limited presence of dust, non-conductive pollution

WARNING

Explosive atmosphere

The EC-Swap is not designed for explosive atmospheres: a spark or heating can cause an explosion and result in death or serious injury.

- Never install or use the EC-Swap in an area exposed to explosive gases.

NOTICE

Ambient conditions

Outside the above limits, the device may be damaged. The EC-Swap enclosure must never be installed or used in an area:

- exposed directly to solar radiation;
- exposed to an ambient temperature above 45 °C;
- exposed to humidity above 80 % or to condensation;
- located above 2000 metres altitude;
- exposed to corrosive gases.

⚠ WARNING**Risk of electric shock**

The symbol "Caution, risk of electric shock" must be present on the EC-Swap enclosure; it must neither be removed nor concealed. A circuit breaker or switch-disconnector allowing the EC-Swap to be de-energised must be installed upstream of it (section 6.2).

NOTICE**Degree of protection**

Degree of protection IP65 is only achieved when the cover is correctly fitted, the cable glands are tightened on cables of suitable diameter and any unused cable gland is sealed. The enclosure has three cable glands: two M32 and one M25.

4.2. Clearances

A distance of at least 100 mm must be maintained between the EC-Swap enclosure and any cable ducts, enclosures and other walls located above, below and at the sides. This distance allows the heat generated by the EC-Swap to be dissipated correctly and prevents electromagnetic interference that could disturb its operation. Also allow space for the cable glands and the bending radius of the cables: the overall height including cable glands is approximately 204 mm (Figure 4).

4.3. Storage

The EC-Swap is not intended to be stored in humid environments: when not installed, degree of protection IP65 is not guaranteed (cable glands not tightened on cables). It must be stored in its original packaging, in a dry room, and never outside the limits specified below:

Parameter	Value
Environment	Indoors, dry, no direct exposure to sunlight
Temperature	-10 to 50 °C
Relative humidity	< 85 % (non-condensing)

4.4. Mounting and removal

⚠ DANGER

Do not work on live equipment!

Contact with live parts (400 V) will result in death or serious injury from electric shock or burns.

- Installation and removal must only be carried out by a qualified technician.
- Isolate and lock out all power supplies before any installation, connection, removal, repair or maintenance work.

Fixing material is not included in the delivery. The installer is responsible for selecting suitable fixing accessories.

The four fixing holes (Ø 4.5 mm, spacing 113.5 × 113.5 mm, Figure 4) are located at the bottom of the corner wells of the enclosure (Ø 8 mm), under the cover screws: they are only accessible with the cover removed. Use Ø 4 mm screws whose head fits into the well (Ø 7.5 mm max.), for example cheese-head screws, with wall plugs suitable for the substrate.

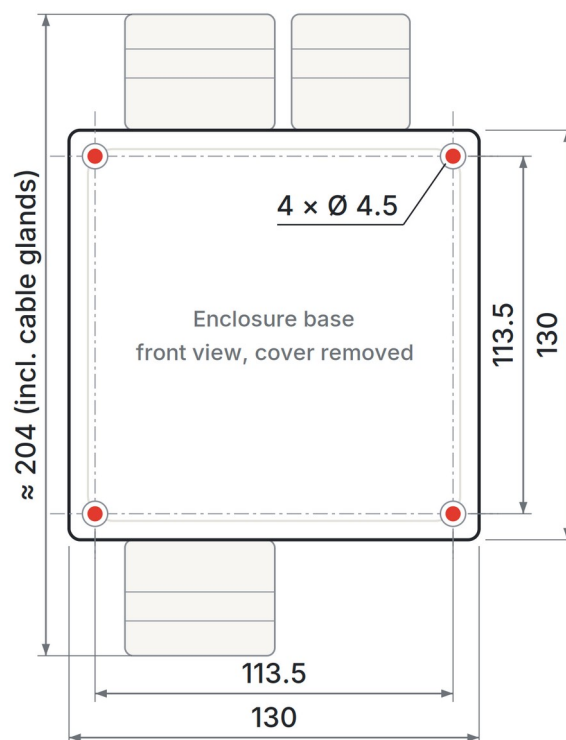


Figure 4: Drilling template, dimensions in mm (figure not to scale; hole spacings taken from the 3D model)

To mount the device:

1. Remove the device cover (4 screws).
2. Hold the EC-Swap level against the wall at the desired location, or transfer the dimensions of the drilling template (Figure 4).
3. Mark the drilling holes, drill and insert the wall plugs.
4. Insert the 4 screws at the bottom of the corner wells, then tighten them without deforming the enclosure base.

To remove the device:

1. Isolate and lock out all power supplies, then remove the device cover.
2. Disconnect the conductors and pull them out of the cable glands.
3. Remove the 4 fixing screws.
4. Remove the EC-Swap.

5. Preliminary modifications to the control cabinet

5.1. Adapting the LS/HS motor feeder

The EC-Swap replaces a two-speed motor with an EC motor without replacing the existing control cabinet. Before any connection, the motor feeder must be adapted: the permanent phases and the LS and HS commands are redistributed to the LS/HS supply input of the EC-Swap, and a voltage monitoring relay is added for fault signalling.

DANGER

Do not work on live equipment!

Contact with live parts (400 V) will result in death or serious injury from electric shock or burns.

- The modifications must only be carried out by a qualified technician.
- Isolate and lock out all power supplies before any work on the control cabinet.

Modification procedure, according to the reference wiring (wiring diagram "EC-SWAP 1 fan", sheets 4 and 5, and Figure 7):

1. Isolate and lock out the power supply of the existing control cabinet.
2. Identify the circuit breaker of the motor feeder, the LS and HS contactors and the outgoing terminals to the old motor (U1, V1, W1, U2, V2, W2, PE).
3. Disconnect the power wiring connecting the LS and HS contactors to the outgoing terminals.
4. Connect the outgoing terminals U1, V1 and W2 to phases L1, L2 and L3, downstream of the circuit breaker (16 A max., section 6.2).
5. Connect the outgoing terminal W1 to pole 5-6 of the LS contactor (phase L3), and terminal U2 to pole 1-2 of the HS contactor (phase L1).
6. Install the three-phase voltage monitoring relay -A1 (Schneider RM22TU23) in the cabinet and connect it in the order L1, V2, L3 (L1 and L3 downstream of the circuit breaker). Relay -A1 also checks the phase sequence: since V2 must carry phase L2, a reversal would be signalled as a fault. Route its contact 11-12-14 to the fault signalling of the cabinet or to the PLC.
7. Connect the protective earth conductor (PE).
8. Check that only one speed (LS or HS) can be commanded at a time: the electrical or mechanical interlock between the LS and HS commands must remain active, so that the two commands can never be applied simultaneously. Also check that no other control signal remains on the outgoing terminals.

6. Electrical connection of the EC-Swap

6.1. Connection area and available connectors

⚠ DANGER

Do not work on live equipment!

Contact with live parts (400 V) will result in death or serious injury from electric shock or burns.

- Installation and removal must only be carried out by a qualified technician.
- Isolate and lock out all power supplies before any installation, connection, removal, repair or maintenance work.

The areas shown are the connection areas accessible to the installer when fitting the EC-Swap.

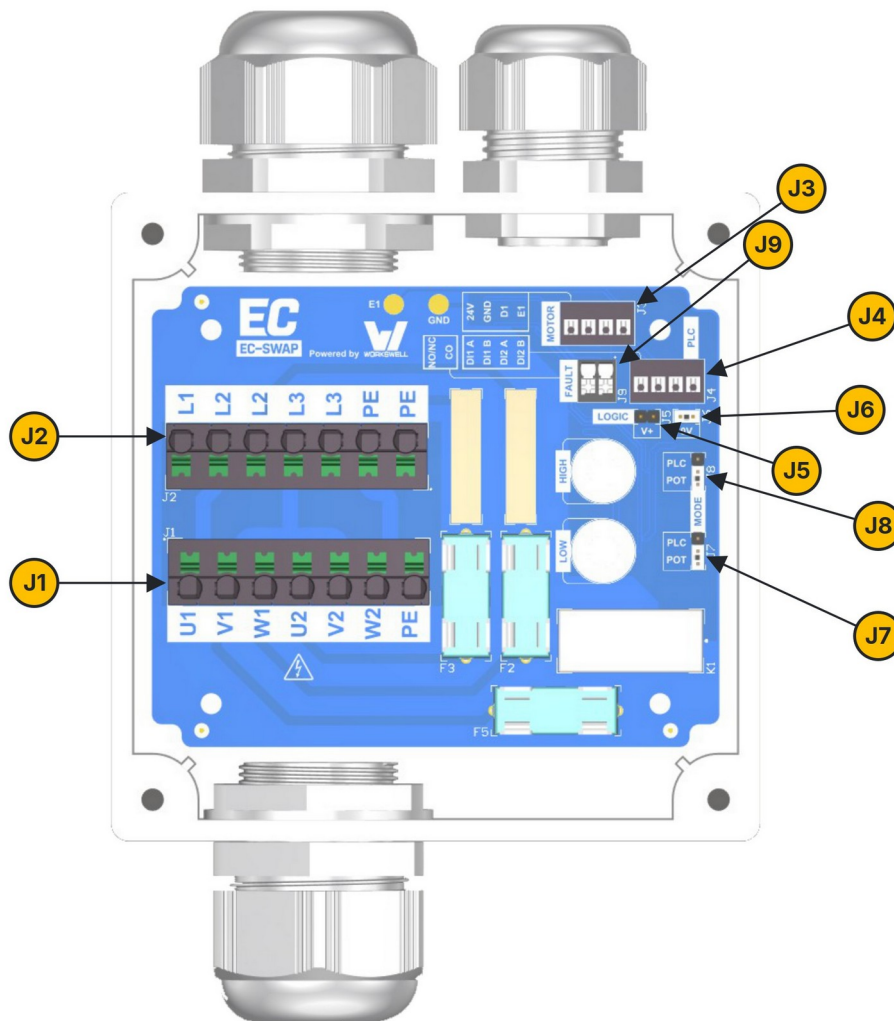


Figure 5: Accessible connection areas, markings J1 to J9

Marking	Function
J1	LS/HS supply terminal block: U1 V1 W1 U2 V2 W2 PE (section 6.2)
J2	EC motor output terminal block: L1 L2 L2 L3 L3 PE PE (section 6.3)
J3	"MOTOR" terminal block of the EC motor logic port: 24V GND D1 E1 (section 6.4)
J4	"PLC" terminal block of the external PLC logic port: DI1 A, DI1 B, DI2 A, DI2 B (section 6.5)
J5	"LOGIC" jumper, position V+ (left)
J6	"LOGIC" jumper, position 0V (right)
J7	Lower "MODE" jumper, positions PLC / POT (next to the LOW potentiometer)
J8	Upper "MODE" jumper, positions PLC / POT (next to the HIGH potentiometer)
J9	"FAULT" terminal block: input for the EC motor fault contact, terminals CO and NO/NC (section 6.4)
E1, GND	Test points for the 0-10 V setpoint transmitted to the EC motor: DC voltage between E1 and GND, measured with a multimeter (section 6.4 and chapter 7)
HIGH, LOW	Speed adjustment potentiometers (section 7.2)
F2, F3, F5	Fuse holders (section 8.2)

6.2. LS/HS supply

DANGER

Do not work on live equipment!

Contact with live parts (400 V) will result in death or serious injury from electric shock or burns.

- Installation and removal must only be carried out by a qualified technician.
- Isolate and lock out all power supplies before any installation, connection, removal, repair or maintenance work.

The LS/HS supply input (J1, Figure 5 and Figure 6) is both the power input and the control input of the EC-Swap. It is connected to the existing control cabinet with 3 × 400 V three-phase without neutral conductor, with the protective earth conductor (PE). U1, V1 and W2 are permanently supplied by L1, L2 and L3, downstream of the circuit breaker; each contactor switches only one phase: the LS contactor switches L3 to W1, the HS contactor switches L1 to U2 (Figure 7). The terminal energised by a contactor (W1 or U2) determines the commanded speed; the EC motor output is supplied by U1, V1 and W2 (section 6.3). Terminal V2 carries the fault return to the voltage monitoring relay in the cabinet (section

3.3). The connection is made through the cable gland provided for this purpose, on spring-loaded terminals.

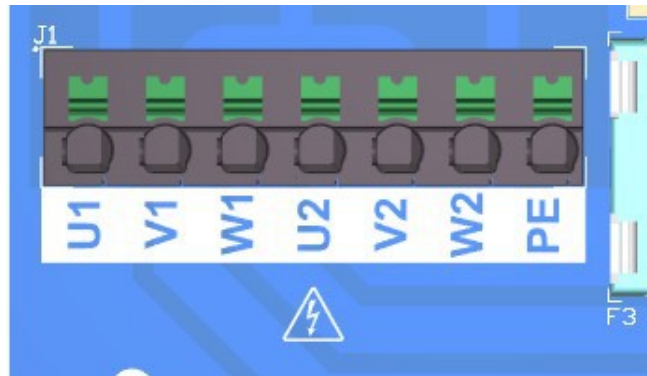


Figure 6: Location of the LS/HS supply (terminal block J1)

⚠ WARNING

Upstream protection and isolation

The EC-Swap has neither overcurrent and short-circuit protection nor a means of isolation. Without suitable protection, a fault can cause a fire or electric shock and result in death or serious injury.

- Only supply the EC-Swap via a three-pole circuit breaker rated 16 A maximum, whose rating is also selected according to the conductor cross-section.
- This circuit breaker, or a switch-disconnector, serves as the means of isolation upstream of the EC-Swap.

Connect according to the printed terminal markings and the diagram in Figure 7: L1, L2 and L3, downstream of the circuit breaker, to U1, V1 and W2; one pole of the LS contactor (L3) to W1; one pole of the HS contactor (L1) to U2; V2 to the three-phase voltage monitoring relay -A1 (Schneider RM22TU23), for fan fault signalling; the protective earth conductor to terminal PE. Observe the conductor cross-sections and stripping length given in chapter 9.

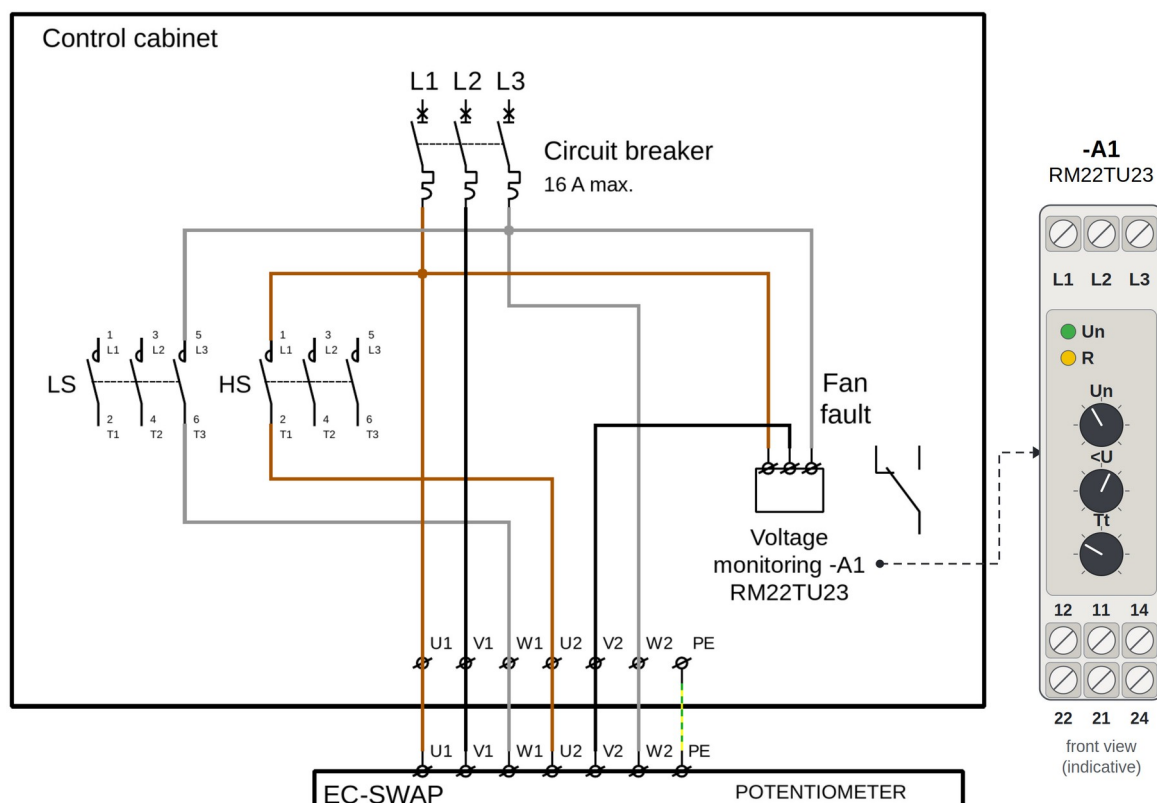


Figure 7: Connection of the LS/HS supply and monitoring relay -A1 (extract from the wiring diagram, example with 1 fan; front view of the relay indicative)

IMPORTANT

Conductor type and cross-section

Only use insulated conductors of suitable cross-section. The conductors must be flame-retardant (VW-1 test according to UL 1581 or equivalent, for example IEC 60332-1-2). For more information, refer to the technical data (chapter 9).

6.3. EC motor supply output

DANGER

Do not work on live equipment!

Contact with live parts (400 V) will result in death or serious injury from electric shock or burns.

- Installation and removal must only be carried out by a qualified technician.
- Isolate and lock out all power supplies before any installation, connection, removal, repair or maintenance work.

The supply output to the EC motor (J2, Figure 5 and Figure 8) delivers the power required by the EC motor at 3×400 V three-phase without neutral conductor, on terminals L1, L2, L3 and the protective earth conductor PE. This output is supplied from the LS/HS input, via U1, V1 and W2: it remains permanently live, whether or not an LS or HS command is present. The command only controls the enable (D1) and the 0-10 V setpoint (E1) of the EC

motor logic port (section 6.4). The connection is made through the cable gland provided for this purpose, on spring-loaded terminals.

⚠ DANGER

Motor output permanently live

The EC motor remains supplied with 3 × 400 V even when stopped, without an LS or HS command: any contact with live parts will result in death or serious injury.

- Switch off and lock out the upstream circuit breaker before any work on the EC-Swap, the motor cable or the EC motor.

NOTICE

Compatible EC motor

The EC-Swap is intended to control an EC motor (fan) supplied with 3 × 400 V three-phase, equipped with an enable input, a 0-10 V setpoint input, a fault signalling contact and an auxiliary 24 V DC output (25 mA minimum) supplying the logic stage of the EC-Swap. As an example, the following motor has been qualified with the EC-Swap:

- Ziehl-Abegg GR31C-ZIK.DC.CR (ref. 116582): 3~ 380-480 V, 50/60 Hz, P1 = 1.60 kW, 2.60-2.10 A, 3160 rpm, IP55.
- The current drawn by the motor (≈ 2.6 A) must remain below the maximum current of the EC motor output (16 A, see chapter 9).

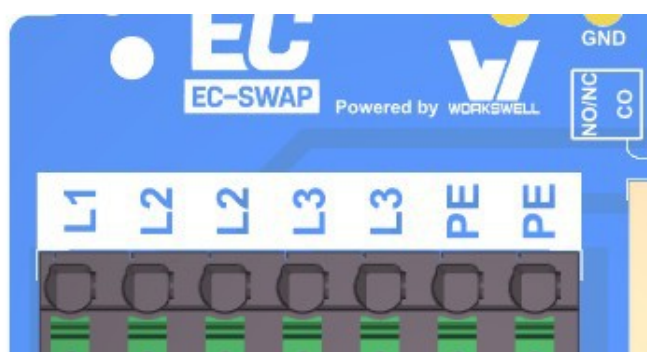


Figure 8: Location of the EC motor output (terminal block J2)

NOTICE

No protection on the output

The EC motor supply output has no overcurrent or short-circuit protection. Protection is provided by the circuit breaker installed upstream (16 A max.) on the LS/HS supply (section 6.2).

Connect according to Figure 9, routing the three phases of the EC motor to terminals L1, L2, L3 and the protective earth conductor to one of the PE terminals, observing the cross-sections and stripping length in chapter 9. The duplicated terminals L2, L3 and PE are used to connect a 400 V transformer.

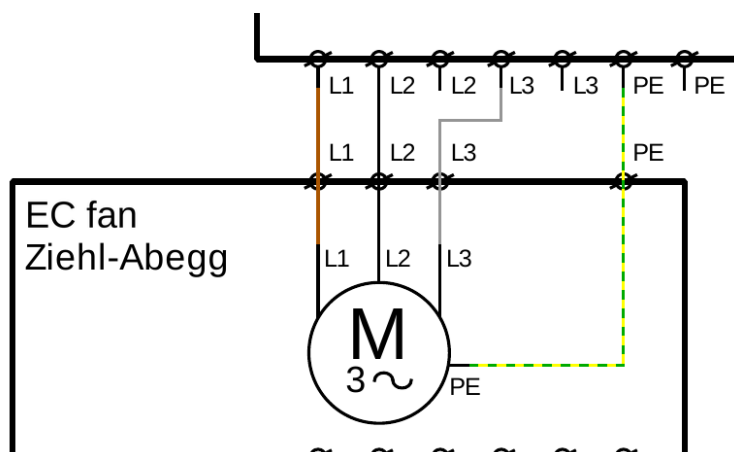


Figure 9: Connection of the EC motor output (extract from the wiring diagram, example with 1 fan)

IMPORTANT

Conductor type and cross-section

Only use insulated conductors of suitable cross-section. The conductors must be flame-retardant (VW-1 test according to UL 1581 or equivalent, for example IEC 60332-1-2). For more information, refer to the technical data (chapter 9).

6.4. EC motor logic port

The EC motor logic port (terminal blocks J3 "MOTOR" and J9 "FAULT", Figure 10) provides the low-voltage control interface between the EC-Swap and the EC motor electronics. It transmits the enable and the speed setpoint (0-10 V analogue signal) and receives the motor fault contact. The pin assignment is as follows, with the correspondence for the qualified Ziehl-Abegg GR31C-ZIK.DC.CR motor:

Terminal block	Terminal	Function	Ziehl-Abegg motor
J3 MOTOR	24V	24 V DC input: supply of the logic stage (25 mA), provided by the EC motor	24V
J3 MOTOR	GND	Ground (0 V)	GND
J3 MOTOR	D1	24 V output: EC motor enable	D1
J3 MOTOR	E1	0-10 V output: speed setpoint (max. 1 mA)	E1
J9 FAULT	C0	Motor fault contact input: common	11 (K1, common)
J9 FAULT	NO/NC	Motor fault contact input: normally closed contact (NC)	12 (K1, NC)

IMPORTANT**Fault contact**

The contact connected to J9 is that of the EC motor (relay K1 of the Ziehl-Abegg); it is not a contact of the EC-Swap. Fault signalling to the cabinet is provided by the V2 return and the monitoring relay -A1 (section 3.3).

Two test points, marked **E1** and **GND** on the board, near the Workswell logo (Figure 10), allow the 0-10 V setpoint transmitted to the EC motor to be checked with a multimeter: the DC voltage measured between E1 and GND is that of output E1 of terminal block J3.



Figure 10: Location of the EC motor logic port (terminal blocks J3 "MOTOR" and J9 "FAULT") and of test points E1 and GND

6.5. External PLC logic port

The external PLC logic port (terminal block J4 "PLC", Figure 11) allows signals to be exchanged with a PLC or a third-party automation system. It has four terminals, associated with the LS command (channel DI1) and the HS command (channel DI2):

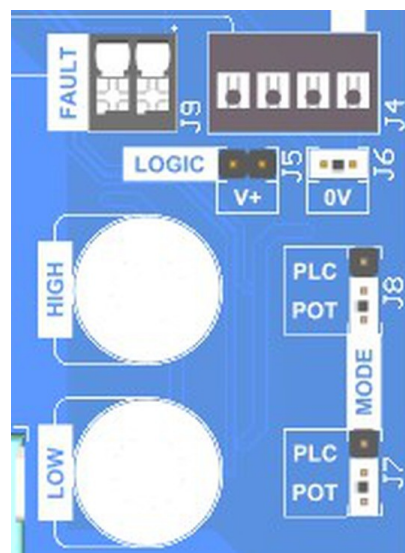


Figure 11: Location of the PLC port (J4), the LOGIC jumpers (J5, J6), the MODE jumpers (J7, J8) and the HIGH and LOW potentiometers

Pin assignment of terminal block J4:

Terminal	Function
DI1 A	Channel 1, LS command (low speed): terminal A
DI1 B	Channel 1, LS command (low speed): terminal B
DI2 A	Channel 2, HS command (high speed): terminal A
DI2 B	Channel 2, HS command (high speed): terminal B

The board also has the **LOGIC** jumper (J5 = V+, J6 = 0V) and the **MODE** jumpers (J7 and J8, positions PLC and POT), which determine respectively the signal logic and the source of each setpoint: board potentiometer (POT) or PLC (PLC). The fault contact is not available on J4: the fault is signalled by relay -A1 (section 3.3).

IMPORTANT

PLC port configuration

For adjustment with the LOW and HIGH potentiometers (section 7.2), the MODE jumpers J7 (LOW) and J8 (HIGH) are in the POT position; in the PLC position, the setpoint comes from the PLC.

7. Commissioning and settings

7.1. Commissioning procedure

DANGER

Dangerous voltages present

Some commissioning operations (tests, potentiometer adjustment) are carried out with the device live and the cover removed. Contact with live parts (400 V) will result in death or serious injury from electric shock or burns.

- These operations must only be carried out by a qualified technician, with the appropriate protective equipment.
- Use 1000 V insulated tools and do not touch any live part (terminal blocks J1 and J2, fuse holders F2, F3 and F5).

Procedure:

1. Check that the mounting (chapter 4), the cabinet modifications (chapter 5) and all connections (chapter 6) have been carried out in accordance with these instructions.
2. Check for the absence of short circuits and the continuity of the protective earth conductor (PE) on all connections.
3. Check the position of the MODE jumpers J7 and J8 (POT for adjustment by potentiometers) and of the LOGIC jumper J5 / J6, see section 6.5.
4. Set the LOW and HIGH potentiometers to a low value beforehand for a first test (section 7.2).
5. Set the monitoring relay -A1 (RM22TU23, front panel: Figure 7): selector Un to 400 V; threshold $<U$ and time delay T_t to be determined at commissioning, according to the installation.
6. With the EC-Swap cover removed, restore the power supply to the cabinet. Check that relay -A1 is powered (green LED on) and energised (yellow LED on): no fault is signalled.
7. LS test: command low speed from the cabinet and check that the EC motor starts and runs at the speed corresponding to the LOW potentiometer setting; the setpoint can be checked with a multimeter between test points E1 and GND (section 6.4).
8. HS test: command high speed and check the change to the speed corresponding to the HIGH potentiometer setting.
9. Fault test: provoke an EC motor fault and check that relay -A1 drops out (yellow LED off, contact 11-12 closed) and that the "fan fault" alarm is reported to the cabinet or the PLC.
10. Adjust the LOW and HIGH potentiometers to their final values (section 7.2).
11. Isolate and lock out the power supply, refit the cover (essential to maintain degree of protection IP65), then re-energise the installation for final commissioning.

7.2. Settings

The speeds are adjusted using the two potentiometers on the board, marked LOW and HIGH (Figure 11), graduated from 0 to 100. Each potentiometer sets the level of the 0-10 V setpoint, and therefore the speed of the EC motor, applied when the corresponding command is active:

- **LOW potentiometer:** sets the speed obtained when the cabinet commands low speed (LS);
- **HIGH potentiometer:** sets the speed obtained when the cabinet commands high speed (HS).

The setpoint is checked with a multimeter, in DC voltage, between test points **E1** and **GND** on the board (Figure 10): the measured voltage is the 0-10 V setpoint transmitted to the EC motor for the active command. Use insulated test probes and do not touch any live part (terminal blocks J1 and J2, fuse holders F2, F3 and F5).

Adjustment procedure, with the device live and the cover removed (see the DANGER box in section 7.1):

1. Apply the LS command (low speed) from the cabinet.
2. Adjust the LOW potentiometer until the desired flow rate (speed) is obtained, starting from a low value.
3. Apply the HS command (high speed) and adjust the HIGH potentiometer in the same way.
4. Isolate and lock out the power supply, then refit the cover before final recommissioning.

IMPORTANT

Setting values

The LOW and HIGH setting values depend on the installation (required air flow, EC motor curve). The 0 to 100 scale of the potentiometers corresponds to a 0 to 10 V setpoint.

8. Maintenance

8.1. Cleaning and decontamination

DANGER

Do not work on live equipment!

Contact with live parts (400 V) will result in death or serious injury from electric shock or burns.

- Installation and removal must only be carried out by a qualified technician.
- Isolate and lock out all power supplies before any installation, connection, removal, repair or maintenance work.

Only the outer surfaces of the EC-Swap may be cleaned, using a dry or slightly damp cloth. Do not use detergents. Always disconnect all power sources before carrying out this operation.

8.2. Replacing the fuses

The EC-Swap has three fuse holders, marked F2, F3 and F5 (Figure 5), which protect the voltage detection circuit and the fault contact circuit (rating 0.5 A, chapter 9). A blown fuse generally indicates a fault in the installation: find and eliminate the cause before any replacement.

DANGER

Do not work on live equipment!

Contact with live parts (400 V) will result in death or serious injury from electric shock or burns.

- Replacement must only be carried out by a qualified technician.
- Isolate and lock out all power supplies before opening the device.

Replacement procedure:

1. Isolate and lock out all power supplies of the EC-Swap, as well as that of the control cabinet.
2. Remove the device cover.
3. Locate the relevant fuse holder according to the board silkscreen (F2, F3 or F5).
4. Remove the faulty fuse and replace it with a new fuse of strictly identical rating, type and rated voltage (chapter 9): a fuse of higher rating removes the protection and may damage the device or create a hazard.
5. Refit the cover correctly (essential to maintain degree of protection IP65) before re-energising.

9. Technical data

9.1. General

Mechanical

Enclosure dimensions	130 mm × 130 mm × 75 mm
Overall height including cable glands	approx. 204 mm
Weight	[TO BE CONFIRMED] g
Mounting type	wall mounting, 4 screws Ø 4 mm (not supplied), holes Ø 4.5 mm, spacing 113.5 × 113.5 mm
Degree of protection	IP65, cover fitted and cable glands tightened
Cable glands	3: 2 × M32 and 1 × M25 (2 at the top, 1 at the bottom)

LS/HS supply input (J1)

Voltage and type	400 VAC, three-phase, without neutral conductor
Frequency	50 Hz
Upstream protection	circuit breaker 16 A max. (not integrated)
Maximum current to EC output	16 A
Maximum current of the fault contact (V2 return)	0.1 A
Replaceable fuses (F2, F3, F5)	0.5 A; protection of the voltage detector and the fault contact
Conductor cross-section, rigid	0.5 ... 2.5 mm ²
Conductor cross-section, flexible	0.5 ... 1.5 mm ²
Stripping length	9-10 mm

EC motor supply output (J2)

Voltage and type	400 VAC, three-phase, without neutral conductor
Frequency	50 Hz
Maximum current	16 A
Protection	none (provided by the upstream circuit breaker)
Conductor cross-section, rigid	0.5 ... 2.5 mm ²
Conductor cross-section, flexible	0.5 ... 1.5 mm ²
Stripping length	9-10 mm

EC motor logic port (J3, J9)

Terminal block type	J3 "MOTOR": 4 poles × 1 row; J9 "FAULT": 2 poles × 1 row
Conductor cross-section, rigid	0.25 ... 1.5 mm ²
Conductor cross-section, flexible	0.25 ... 1.5 mm ² (with ferrule: max. 0.75 mm ²)
24V supply input	24 VDC, 25 mA (consumption of the logic stage)
D1 enable output	24 VDC
E1 control output	0-10 V, max. 1 mA
Fault input (J9)	volt-free contact of the EC motor (CO, NO/NC)

External PLC logic port (J4)

Terminal block type	4 poles × 1 row (DI1 A, DI1 B, DI2 A, DI2 B)
Conductor cross-section, rigid	0.25 ... 1.5 mm ²
Conductor cross-section, flexible	0.25 ... 1.5 mm ² (with ferrule: max. 0.75 mm ²)
Maximum permissible voltage DIx	± 30 VDC between DIx and 0 V

9.2. Compatible EC motor (example)

The EC-Swap controls an EC motor (fan) supplied with 3 × 400 V three-phase, equipped with an enable input, a 0-10 V setpoint input, a fault signalling contact and a 24 V DC auxiliary output (at least 25 mA) supplying the logic stage of the EC-Swap. The motor below has been qualified with the EC-Swap:

Reference	Ziehl-Abegg GR31C-ZIK.DC.CR (ref. 116582)
Supply	3~ 380-480 V
Frequency	50 / 60 Hz
Power input P1	1.60 kW
Current	2.60 ... 2.10 A
Speed	3160 rpm
Degree of protection	IP55
Logic connection	24V, GND, D1, E1; relay K1: 11 (common), 12 (NC) — section 6.4
Motor 24V auxiliary output	24 VDC, max. 70 mA (Ziehl-Abegg connection diagram)

IMPORTANT

Motor compatibility

The current drawn by the EC motor must remain below the maximum current of the EC motor output (16 A).

10. Disposal procedure

10.1. Disposal

This product is subject to European Directive 2012/19/EU on waste electrical and electronic equipment (WEEE). It must not be disposed of with household waste, but must be collected separately for recycling in accordance with the regulations in force.

Packaging materials

- Collect them separately.
- Observe the local regulations in force.
- Flatten the cardboard to reduce its volume.

11. Contact

11.1. Contact

If you have any questions or problems concerning the product, please contact customer service.

E-mail	info@wellset.ch
Telephone	+41 27 326 60 00
Website	wellset.ch
Address	Wellset — a brand of Workswell Sàrl Rue de l'Industrie 10 1950 Sion Switzerland

12. Declaration of conformity

The EU declaration of conformity for the EC-Swap is issued under the sole responsibility of the manufacturer, Workswell Sàrl. It contains the following elements:

Manufacturer	Workswell Sàrl, Rue de l'Industrie 10, 1950 Sion, Switzerland
Product	Control converter for EC motors
Type / model	EC-Swap / WW-EC-SWAP-1
Union harmonisation legislation	2014/30/EU: electromagnetic compatibility 2014/35/EU: low voltage 2011/65/EU: RoHS, amended by Delegated Directive (EU) 2015/863
Harmonised standards applied	EN 61010-1:2010 + A1:2019 + AC:2019-04 EN 61326-1:2013
Place and date	Sion, 05.10.2026
Signed for and on behalf of	Patrick Savioz, Director, Workswell Sàrl

	EU Declaration of Conformity	
<p>We, Workswell Sàrl Rue de l'Industrie 10 1950 Sion Switzerland</p> <p>hereby declare that the product type EC-Swap WW-EC-SWAP-1</p> <p>is in conformity with the relevant Union harmonization legislation: <div style="display: flex; justify-content: space-between;"> <div> 2014/30/EU 2014/35/EU 2011/65/EU </div> <div> EMC Directive Low Voltage Directive RoHS Directive </div> </div> </p> <p>Harmonized standards applied: EN 61010-1:2010 + A1:2019 + AC:2019-04 EN 61326-1:2013</p> <p>This declaration of conformity is issued under the sole responsibility of the manufacturer.</p>		
Place and date:		Signed for and on behalf of:
Sion, Le 05.10.2026		Patrick Savioz, Director Workswell Sàrl

Figure 12 : Copy of the EU declaration of conformity of 05.10.2026