Electromote

INDUSTRIAL
DRIVE SOLUTIONS

RELIABLE MOTOR CONTROL FOR DEMANDING ENVIRONMENTS

PRODUCT CATALOGUE

ES350 ES580 ES355PV ES560PV VFD510 VKS8000

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Introduction

The Electrodrive range of Variable Speed Drives (VSDs) provides a structured portfolio of industrial motor control solutions engineered for reliability, efficiency, and application flexibility. The range includes compact OEM drives, high-performance industrial platforms, solar pumping inverters, IP55 field-mounted units, and motor soft starters covering 0.4 kW to 560 kW.

1.1 PRODUCT PORTFOLIO OVERVIEW

Product Family	Power Range	Application	Key Differentiator
ES350	0.4–4 kW	Compact general purpose	Simple, cost-effective V/F and SVC
ES580	4–560 kW	Industrial / mining	Advanced V/F and SVC vector control, built-in PLC, fieldbus
ES355PV	0.4–4 kW	Solar pumping	Hybrid DC/AC input, MPPT tracking up to 99.5% (steady-state)
ES560PV	4–132 kW	Solar pumping	Dual voltage 400/800 VDC, large-scale
VFD510	2.2–45 kW	Harsh environments	IP55 protection, STO safety
VKS8000	11–500 kW	Soft starting	Built-in bypass contactor; fixed-speed operation only

1.2 Quick Selection Cross-Reference

Use this table to quickly identify which product families are available at your required motor power rating.

Motor kW	ES350	ES580	ES355PV	ES560PV	VFD510	VKS8000
0.4	✓	–	✓	–	–	–
0.75	✓	–	✓	–	–	–
1.5	✓	–	✓	–	–	–
2.2	✓	–	✓	–	✓	–
4.0	✓	✓	✓	✓	✓	–
5.5	–	✓	–	✓	✓	–
7.5	–	✓	–	✓	✓	✓
11	–	✓	–	✓	✓	✓
15	–	✓	–	✓	✓	✓
18.5	–	✓	–	✓	✓	✓
22	–	✓	–	✓	✓	✓
30	–	✓	–	✓	✓	✓
37	–	✓	–	✓	✓	✓
45	–	✓	–	✓	✓	✓
55	–	✓	–	✓	–	✓
75	–	✓	–	✓	–	✓
90	–	✓	–	✓	–	✓
110	–	✓	–	✓	–	✓
132	–	✓	–	✓	–	✓
160-500	–	✓	–	–	–	✓

1.3 Technical Standards & Compliance

Standard	Scope
IEC 61800-5-2	Safe Torque Off (STO) functional safety (VFD510, ES580)
IEC 60529	Degrees of protection (IP ratings)
CE Directives	Conformity with relevant EU Low Voltage and EMC Directives

EMC category and filter configuration may vary by model and frame size. Installation must be performed by qualified personnel in accordance with local electrical codes. Drives were certified to the editions current at time of manufacture; refer to the declaration of conformity for specific standard editions.

1.4 Electrical Supply Conditions

Parameter	Specification
Input Frequency	50/60 Hz ±5% (automatic detection on most models)
Voltage Fluctuation	−15% to +10% (ES series wide-voltage design)
Supply Phase Balance	≤3% imbalance recommended
Supply THD	Recommended supply <8% for optimal performance
Carrier Frequency	1–12 kHz (varies by product; see individual specifications)

Operation outside these ranges may result in drive faults, reduced performance, or component damage. Optimal performance and extended component life are achieved when supply voltage remains within ±10% of nominal rating. For applications with known supply instability, consult technical support for line reactor or isolation transformer recommendations

1.5 Motor Compatibility & Application Guidance

Compatible Motor Types

Electrodrive VSDs support three-phase asynchronous (induction) motors as standard, including standard IEC and premium efficiency motors. Permanent Magnet Synchronous Motors (PMSM) are supported where specifically indicated in product specifications (ES580, VFD510). PMSM applications require accurate motor parameter entry during commissioning.

Motor Insulation Requirements

Compatible insulation classes: Class F (155 °C) and Class H (180 °C). VSD output uses Pulse Width Modulation (PWM) which creates high dV/dt voltage rise rates. Use motors rated for inverter duty or VSD-compatible operation. Motor cables exceeding 100 m require output AC reactor or dV/dt filter installation. Large motors (IEC frame size > 250) require bearing current mitigation.

WARNING: PMSM motor data must be verified and correctly programmed before operation. Failure to properly commission PMSM applications can result in motor damage, drive damage, or unsafe operation.

Expected Motor Performance Characteristics

When operated from a VSD, motors may exhibit slightly different characteristics compared to direct grid (DOL) connection. These effects are normal and do not indicate drive or motor malfunction.

Characteristic	Expected Effect	Mitigation
Temperature Rise	5–15 °C increase typical due to PWM harmonics and reduced cooling at low speeds	Monitor on first installations; usually within motor thermal limits
Audible Noise	Increased acoustic noise especially at low speeds; PWM creates characteristic hum	Increase carrier frequency (may slightly reduce drive efficiency)
Vibration	Marginally increased vibration in some operating conditions	Ensure motor is properly balanced and mounted; not typically a concern
Starting Current	Reduced vs. DOL start (VSD limits to 150% rated)	Advantage over DOL; reduced stress on supply and mechanical coupling

1.6 Braking & Energy Handling

Electrodrive VSDs support dynamic braking where specified. Standard drives are non-regenerative: regenerative energy is dissipated as heat via a braking resistor and is not returned to the supply grid. Built-in braking transistors are available on selected models (see individual product specifications). External braking resistors must be sized for the application duty cycle, and resistance values must match drive specifications.

Important: Standard Electrodrive drives are non-regenerative.
Energy is dissipated as heat, not returned to the grid.
For regenerative applications requiring energy recovery, contact technical support.

1.7 Environmental & Installation Conditions

Parameter	Specification
Standard Altitude	≤1000m above sea level without derating
Altitude Derating	1% per 100m above 1000m (e.g. 2000m = 10% derating)
Operating Temperature	-10°C to +40°C without derating (most models to +55°C with derating)
High-Temp Derating	Typically 2-5% per °C above 40°C (consult product datasheet)
Humidity	≤95% RH non-condensing (VFD510: condensing allowed with IP55)
Vibration	<5.9 m/s² (0.6G) per IEC 60068-2-6
Shock	<19.6 m/s² (2G) per IEC 60068-2-27
Corrosive Gas	Grade C3 per IEC 60721-3-3 (ES580 conformal coating)
Installation Category	CAT III per IEC 60664-1
Clearances	Minimum 100mm top/bottom, 50mm sides for airflow

1.8 Power Terminal Identification

Terminal	Function	Description
R, S, T	AC Power Input	Three-phase mains supply (R for single-phase)
U, V, W	Motor Output	Three-phase output to motor
PE	Protective Earth	Mandatory safety ground connection
+, BR	Braking Resistor	External braking resistor connects across + and BR (via internal chopper)
+, –	DC Bus	DC bus terminals for external braking units

WARNING: Do not connect input power to output terminals (U, V, W).
WARNING: The braking resistor must connect across the + and BR terminals only. These terminals include the internal braking chopper transistor which controls energy dissipation. Do not connect a braking resistor directly across the + and – DC bus terminals – doing so will create a short-circuit through the rectifier bridge and may cause severe equipment destruction.

1.9 Ordering Code Nomenclature

All Electrodrive model codes follow a structured naming convention. Understanding this code enables correct product identification and ordering:

ES Series Naming Convention
Format: ES XXX - XX - XXXG/XXXP - XB - XX

Position	Element	Values
ES XXX	Product Series	350 = Compact, 355 = Solar (small), 560 = Solar (large), 580 = Industrial
XX	Frame/Dimension Code	F0, 01, 02, 02A, 03, 04, 05… (B0, B1 etc. for solar)
XXXG	Heavy Load Power	e.g. 5K5G = 5.5 kW heavy duty rated
XXXP	Light Load Power	e.g. 7K5P = 7.5 kW light duty rated
X (voltage)	Voltage Class	1 = 1 Ph 220 V, 3 = 3 Ph 380 V, 5 = 3 Ph 525 V
B	Brake Chopper	B = built-in, None = without
PV	Function Code	PV = Solar pump function (ES355PV/ES560PV only)
P_01	Function Code	P_01 = AquaLogic function (ES350/ES580 only)

VFD510 Naming Convention
Format: VFD510 - XXX - T4B

Position	Element	Values
VFD510	Product Series	High Protection IP55 Inverter
XXX	Power Rating	e.g. 2R2 = 2.2kW, 011 = 11kW, 045 = 45kW
T4	Voltage Class	T4 = Three-phase 380V
B	Brake Unit	B = built-in brake unit, (B) = optional

VKS8000 Naming Convention
Format: VKS8000 - XXX - Z

Position	Element	Values
VKS8000	Product Series	Motor Soft Starter
XXX	Power Rating (kW)	e.g. 011 = 11kW, 075 = 75kW, 500 = 500kW
Z	Connection Type	Z = Star (Wye) connection rated current

1.10 System Integration Guidance

- Line reactors recommended for drives > 30 kW or where supply transformer capacity is less than 10× drive rating.
- Output reactors recommended above 100 m motor cable.
- Shielded cable recommended for EMC compliance.
- Earth leakage protection: VSD output contains DC current components that will blind standard Type AC RCDs. Where earth leakage protection is required (e.g. per SANS 10142), use Type B RCDs. Type A RCDs detect pulsating DC fault currents but not smooth DC components present on VSD outputs and are insufficient. Type F RCDs provide an intermediate option for single-phase-fed drives. Consult SANS 10142 and the RCD manufacturer.

1.10(a) Cable Sizing, Circuit Protection & Accessory Selection

Cable Sizing and Circuit Protection

The table below provides minimum cable cross-sections and circuit protection ratings for Electrodrive VSD supply and motor cables. Sizing is based on drive rated output current (IN) and applies across all product series and voltage classes — the same drive current requires the same cable regardless of whether it is a 400 V or 525 V installation.

How to use this table: Step 1 — Find the rated current (IN) of your drive in the model selection table of the relevant product section.
Step 2 — Locate the current band in the table below.
Step 3 — Use the minimum cable size for both supply (input) and motor (output) cables.
Step 4 — Select a gG fuse or MCCB rated at or above the value shown.

Important — Cable Sizing Caveats: These are minimum recommendations based on IEC 60364-5-52 standard conditions. Final cable sizing must be verified by a qualified electrician against actual installation conditions.
Derate cable capacity for: ambient temperature above 40 °C; cables grouped in the same conduit or trunking; direct burial; or solar UV exposure.
Fuse type: gG (general purpose). For MCCB selection, use a motor-circuit type or magnetic-only trip characteristic to avoid nuisance tripping caused by VSD capacitor inrush current on power-up.
All cable installations must comply with SANS 10142-1 (Code of Practice for the Wiring of Premises) and applicable electrical regulations.
For 525 V and 690 V class drives, the same current-based cable sizing applies. Insulation voltage rating of cable must be appropriate for the supply voltage.
Supply cable and motor cable may differ in cross-section where motor current differs significantly from input current (e.g. in light-load applications).

Drive Rated Current IN	Min. Supply & Motor Cable (Cu, IEC 60364-5-52)	gG Fuse Rating	MCCB Rating
Up to 6 A	2.5 mm²	10 A	10 A
6 – 10 A	4 mm²	16 A	16 A
10 – 16 A	6 mm²	20 A	20 A
16 – 25 A	10 mm²	35 A	32 A
25 – 40 A	16 mm²	50 A	40 A
40 – 63 A	25 mm²	80 A	63 A
63 – 100 A	35 mm²	125 A	100 A
100 – 130 A	70 mm²	160 A	125 A
130 – 200 A	95 mm²	250 A	200 A
200 – 260 A	120 mm²	315 A	250 A
260 – 320 A	150 mm²	400 A	315 A
320 – 400 A	185 mm²	500 A	400 A
400 – 500 A	240 mm²	630 A	500 A
500 – 650 A	300 mm²	800 A	630 A
650 – 800 A	2 × 185 mm²	1000 A	800 A
800 – 1000 A	2 × 240 mm²	1250 A	1000 A
1000 – 1100 A	2 × 300 mm²	1600 A	1250 A

Table 1.10(a)-1
Minimum cable and circuit protection selection by drive rated current.
Cable ratings per IEC 60364-5-52, copper conductor, PVC insulation, in conduit at 40 °C ambient, single circuit.

AC and DC Reactor Selection

Line reactors (AC input and output) and DC bus reactors improve power quality, protect the drive, and extend motor life. The table below identifies when each reactor type should be fitted. For model-specific reactor current ratings and inductance values, refer to the ES580 Hardware Manual, Chapter 11 (du/dt and common mode filtering).

Reactor Type	Fit When…	Benefit
Input (AC)	Supply transformer capacity > 600 kVA relative to drive rating Supply voltage imbalance > 3% Power factor correction capacitor bank on same supply node Supply THD > 8% or significant thyristor/rectifier loads nearby	Reduces input current THDi; protects rectifier from voltage spikes; improves power factor
Output (AC)	Motor cable length exceeds 100 m Motor is not rated for inverter duty Multiple motors connected to one drive output Audible motor noise is unacceptable at high carrier frequency	Limits dV/dt voltage rise; reduces bearing current; protects motor insulation; extends cable reach
DC Bus	Available on ES580 ≥ 15 kW (built-in). For VFD510 Size C–D (15–45 kW) connect external DC reactor to reserved terminals. For ES350 and ES580 4–11 kW: add external DC bus reactor if THDi compliance required	Where DC reactor is built-in reduces THDi

Table 1.10(a)-2 Reactor type, trigger conditions, and benefits. Reactor sizing by model: refer to ES580 Hardware Manual Chapter 11.

Reactor Selection Note: AC input reactors are typically sized at 3–5% impedance relative to drive kVA rating. This provides meaningful harmonic reduction without excessive voltage drop.
Output reactors for long cable runs should be sized for the motor cable capacitance — this is length and cable type dependent. As a guide: 0.5 mH for cables up to 150 m; 1 mH for cables up to 300 m. Contact Electrodrive technical support for reactor part numbers and application-specific sizing.

Braking Resistor — Selection Reference

External braking resistors are required when an application demands rapid deceleration, speed reversal, or overhauling loads (e.g. cranes, hoists, centrifuges, winding machines). Drives with a built-in brake chopper transistor can accept a directly connected resistor — refer to the model selection tables for brake chopper availability per model.

Braking resistor selection is application-specific and depends on deceleration time, load inertia, braking duty cycle, and ambient temperature. The table below provides a summary guide. For complete model-by-model resistance and wattage values, refer to the ES580 Hardware Manual, Chapter 12 (Resistance Braking).

Parameter	General Applications (20% braking duty)	Heavy / Hoist Applications (50% braking duty)
Resistance (Ω)	See Hardware Manual Ch. 12 — min. resistance decreases as drive power increases (range: ≥8 Ω to ≥300 Ω)	Lower resistance required — see Hardware Manual Ch. 12 for specific values by model
Resistor Power (W)	See Hardware Manual Ch. 12 — increases with drive power (range: ≥100 W to ≥16,000 W)	Higher wattage required — consult Hardware Manual or Electrodrive technical support
Connecting Cable	1.0–35 mm² depending on drive size (see Hardware Manual Ch. 12)	Same cable sizing; maximum brake resistor cable length 20 m
Terminal Connection	(+) and PB terminals only — never connect across (+) and (–) DC bus	(+) and PB terminals only — never connect across (+) and (–) DC bus
Safety Requirements	Resistor must be mounted in flame-retardant enclosure — surface temperature may exceed 200°C	Thermal protection relay recommended to protect against overheating during extended braking

Table 1.10(a)-3 Braking resistor selection summary. Full resistance and wattage selection data: ES580/ES350 Hardware Manual Chapter 12.

Braking Resistor Safety Warning: The braking resistor must be connected across the (+) and PB terminals ONLY. Never connect a braking resistor directly across the (+) and (–) DC bus terminals — this will cause a short-circuit through the rectifier bridge and may result in severe equipment destruction.
Braking resistor surface temperature can exceed 200 °C during operation. Mount in a flame-retardant enclosure with adequate airflow. Keep away from heat-sensitive equipment and materials.
Maximum braking resistor cable length is 20 metres. Use cables rated for the peak braking current and temperature.
For hoist and crane applications where braking is safety-critical, install a thermal protection relay on the resistor circuit and wire the relay contact to the drive's external fault input

Earth Leakage Protection

Standard Type AC residual current devices (RCDs) cannot be used with VSD outputs. VSD output current contains DC components that will desensitise or blind a Type AC RCD, creating a shock hazard. The following RCD types apply:

RCD Type	Detects	VSD Suitability	Recommendation
Type AC	Sinusoidal AC fault currents only	✗ NOT suitable	Do not use with VSD outputs
Type A	AC + pulsating DC fault currents	⚠ Partial	Insufficient — smooth DC components present on VSD output will blind Type A
Type F	AC + pulsating DC + high-frequency	✓ Acceptable	Suitable for single-phase-fed VSDs only
Type B	AC + pulsating DC + smooth DC + high-frequency	✓✓ Required	Mandatory where RCD protection is required on 3-phase VSD output per SANS 10142

Table 1.10(a)-4 RCD type suitability for VSD installations. Reference: SANS 10142-1, IEC 62423.

Type B RCDs are significantly more expensive than Type AC/A units and may have limited local availability. Where cost or availability is a constraint, consult a qualified electrician about alternative protection methods such as isolation transformers, impedance-earthed systems, or GFCI protection designed for VSD applications.

General Note: The cable sizing, protection ratings, and accessory selection guidance in this section are provided as a general reference for qualified electrical engineers and panel builders. All electrical installations must be designed, installed, and commissioned by a qualified electrician in accordance with SANS 10142-1 and all applicable electrical installation regulations.
Electrodrive technical support is available for application-specific sizing queries: +27 63 694 1108 | steve@electromote.co.za

ES350 Series — Compact Frequency Converters

Introduction

The ES350 is a compact, cost-effective variable frequency drive designed for light-duty and general-purpose applications in the 0.4–4.0 kW power range. It accepts both single-phase 220–240 VAC and three-phase 380–480 VAC input, making it versatile for smaller installations. With V/F and Sensorless Vector Control (SVC), and a built-in EMC filter, the ES350 delivers reliable performance in a space-saving footprint. The ES350 suits applications such as fans, pumps, conveyors, and small machine tools where straightforward speed control is the priority.

Key Features

- **Automatic optimum parameter setting:** Select the mechanical application via the usage-selection function and the drive configures itself, reducing commissioning time and eliminating tedious trial runs.
- **Built-in application macros** for common mechanical loads including air conditioning, fans, pumps, compressors, conveyors, and winding/unwinding units.
- **Over-excitation braking** achieves emergency stopping even without an external brake resistor. Built-in braking unit included as standard.
- **Comprehensive auto-tune functions:** rotating auto-tune, stationary auto-tune, inter-phase resistance measurement, and energy-optimisation learning — enabling adaptation to various motor types and operating conditions.
- **Compact modular design** with minimum dimensions of 82 × 176 × 131 mm, reducing footprint by approximately 30% and volume by approximately 45% versus comparable drives.
- **English LCD smart keypad** with large-text display for fast parameter setting, detailed status monitoring, fault diagnostics, and built-in parameter backup/duplicating function.

Technical Specifications

Power and Mains Supply	
Power Range	0.4–4.0 kW
Input Voltage	Single / Three-phase 208–240 VAC (−15% to +10%) Three-phase 380–480 VAC (−15% to +10%)
Input Frequency	50 Hz / 60 Hz (±5%)
Output Voltage	Three-phase, 0 V to input voltage
Efficiency	93–96% at rated load
Input Phase Imbalance	≤ ±3%
Output and Performance	
Output Frequency	0–1 000 Hz (V/F control) | 0–500 Hz (Vector control)
Control Method	V/F Control (open-loop) | Sensorless Vector Control (SVC)
Overload Capacity	Heavy duty: 150% rated current for 60 s (Once every 10 minutes), peak 180% for 10 s Light load: 110% rated current for 60 s (Once every 10 minutes)
Starting Torque	Up to 150% rated torque at 0.5 Hz (SVC). Higher values may be achievable with optimised auto-tune.
Speed Control Range	1:100 (V/F) | 1:200 (SVC)
Speed Accuracy	±0.25% (SVC)
Carrier Frequency	2–12 kHz (adjustable; auto-adaptive to load and temperature)
Frequency Resolution	Digital input: 0.01 Hz | Analogue input: 0.1% of maximum frequency

Protection and Reliability	
Protection Grade	IP20 (standard) | IP55 (optional panel / cabinet installation)
Automatic Voltage Regulation	Maintains stable output voltage during input supply fluctuation
Fast Current Limiting	Minimises overcurrent faults to reduce nuisance trips
Stall Prevention	Automatic overvoltage and overcurrent stall control during accel / decel
Torque Limiting	Automatic torque limiting to prevent overcurrent faults under high-torque loads
Cooling	Forced air cooling
Ambient Temperature	−10 °C to +40 °C operating | up to +55 °C with automatic derating
EMC Standard	IEC 61800-3 | IEC 61800-5-1
EMC Classification	C3 – Second environment (Industrial)
EMC Filter	Built-in EMC filter
Communication and I/O	
Communication – Standard	Modbus RTU (RS-485) + CANopen
Communication – Optional	Modbus TCP, PROFINET, PROFIBUS-DP, and EtherCAT (available via plug-in expansion communication cards)
Digital Inputs	6 programmable digital inputs (DI1–DI6) DI6 supports high-speed pulse input up to 50 kHz
Analogue Inputs	2 analogue inputs (AI1, AI2) | 0–10 V voltage or 0–20 mA current (selectable)
Digital Outputs	1 digital output (DO1) – open collector; supports high-speed pulse output 0–50 kHz
Analogue Outputs	1 analogue output (AO) | 0–10 V or 0–20 mA (selectable)
Relay Output	1 relay output | 250 VAC / 3 A (resistive) | 30 VDC / 1 A (resistive) | Min. wetting current: 10 mA

NOTE: Output frequencies above 100 Hz are intended for specialised high-speed motor applications only. Standard IEC induction motors must not be operated above their rated frequency without verifying mechanical suitability. Consult the motor manufacturer before operating above base frequency.

Model Selection Table

Model (Standard)	Model (AquaLogic)	Power (G)	Current	Frame	Brake
ES350-F0-04KG/0K7P-1B	ES350-F0-04KG/0K7P-1B-P_01	0.4 kW	2.5 A	F0	Built-in
ES350-F0-0K7G/1K5P-1B	ES350-F0-0K7G/1K5P-1B-P_01	0.75 kW	4.5 A	F0	Built-in
ES350-F0-1K5G/2K2P-1B	ES350-F0-1K5G/2K2P-1B-P_01	1.5 kW	7 A	F0	Built-in
ES350-F0-2K2G-1B	ES350-F0-2K2G-1B-P_01	2.2 kW	9 A	F0	Built-in
ES350-F0-0K7G/1K5P-3B	ES350-F0-0K7G/1K5P-3B-P_01	0.75 kW	2.5 A	F0	Built-in
ES350-F0-1K5G/2K2P-3B	ES350-F0-1K5G/2K2P-3B-P_01	1.5 kW	4 A	F0	Built-in
ES350-F0-2K2G/4K0P-3B	ES350-F0-2K2G/4K0P-3B-P_01	2.2 kW	5 A	F0	Built-in
ES350-F0-4K0G-3B	ES350-F0-4K0G-3B-P_01	4.0 kW	8 A	F0	Built-in

Power (G) = Heavy-duty (constant torque) rating. To order with AquaLogic, use the -P_01 model code.
Electrical ratings are identical; the AQUALOGIC adds multi-pump cascade control firmware.

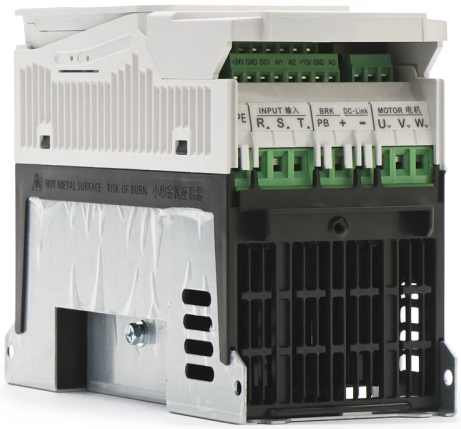
Dimensions and Weight

Frame	W (mm)	H (mm)	D (mm)	A (mm)	B (mm)	Weight (kg)
F0	82	176	131	65	168	1.3

All ES350 models use the F0 frame. W = Width, H = Height, D = Depth, A/B = Mounting hole spacing.

Typical Applications

Small pumps and fans, light-duty conveyors, packaging machinery, textile equipment, food processing equipment, small compressors, and OEM machine integration.



Wiring Diagrams

Important: All wiring must be performed with power supply isolated and verified de-energised. Ensure DC bus voltage is below 50 V before working on any drive terminals (minimum 5-minute discharge period after power removal).

ES350 SERIES — Standard Wiring Diagram

The diagram on the next page shows the standard wiring arrangement for the ES350 compact frequency converter, including the main power circuit (R/L1, S/L2, T/L3 input; U, V, W motor output), control circuit terminals (DI1–DI6 digital inputs, AI1/AI2 analogue inputs, relay output, Modbus RS-485), and optional accessories (brake resistor, output reactor, EMC filter).

Terminal Group	Terminals	Function
Power Input	R/L1, S/L2, T/L3	3-phase 380–480 VAC or 1-phase 220–240 VAC supply
Motor Output	U, V, W	3-phase output to motor — do not connect input power here
Braking	(+), PB	External braking resistor connection (internal chopper standard)
Digital Inputs	DI1–DI6	6 programmable inputs; DI6 supports high-speed pulse to 50 kHz
Analogue Inputs	AI1, AI2	0–10 V or 0–20 mA (jumper selectable per channel)
Analogue Output	AO	0–10 V or 0–20 mA (jumper selectable)
Digital Output	DO1	Open collector; pulse output 0–50 kHz
Relay Output	R1A, R1B, R1C	AC 250 V / 3 A; DC 30 V / 1 A
RS-485 / Modbus	A+, A–	Modbus RTU; CANopen via RJ45 panel port
24 V Supply	+24V, GND	Max. 200 mA for external use

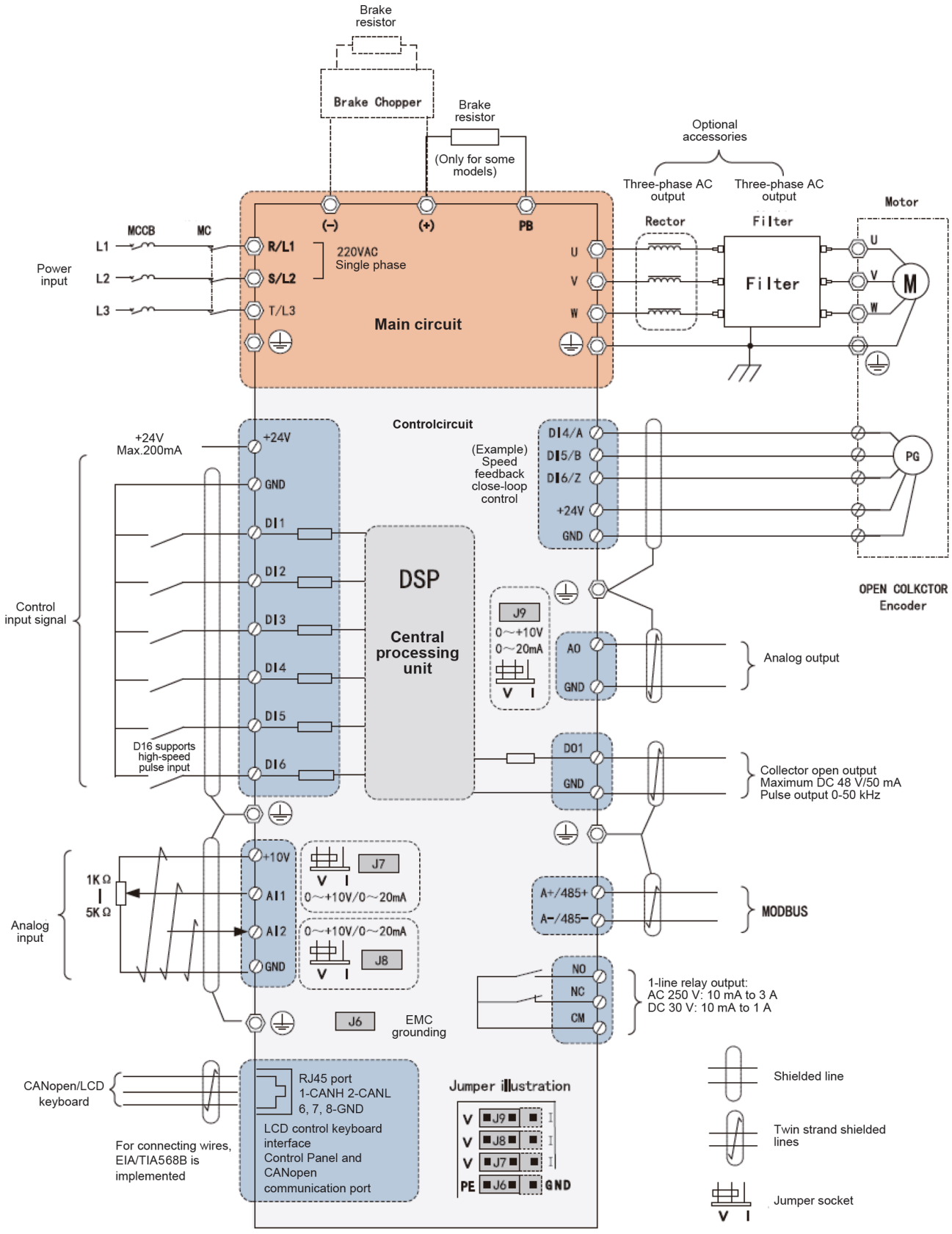


Figure 2-1 ES350 Series — Standard Wiring Diagram

NOTE: Encoder interface terminals shown are an ES850 Series feature and they do not apply to the ES350. ES350 expansion slots support Fieldbus communication cards only.

ES580 Series — Industrial Frequency Converters

Introduction

The ES580 is a high-performance, universal variable frequency drive covering 4–560 kW across three-phase 380–480 VAC, 480–525 VAC and 660–690 VAC supply classes. It supports V/F and Sensorless Vector Control (SVC), enabling precise speed and torque regulation for demanding industrial processes. With Safe Torque Off (STO) compliant with IEC 61800-5-2, a built-in DC reactor (15 kW and above), and an independent air-duct cooling architecture, the ES580 is engineered for continuous heavy-duty service in harsh environments.

NOTE: The 400V and 525V classes share an overlap at 480 VAC. Select voltage class matching site nominal supply. For RSA 525 VAC supplies, always specify the 525 V class.

Key Features

- **Comprehensive motor drive technology** supporting induction, SPM synchronous, and IPM synchronous motors — switchable via parameter settings alone, with no hardware changes required.
- **Smart drive suite:** adaptive V/F curve setting, industry-application parameter presets, real-time temperature monitoring with adaptive algorithms, and intelligent fault diagnosis recording maximum current, voltage, and temperature extremes.
- **Innovative independent air-duct design** separating electronics from the main heat path, preventing dust ingress and component failures from radiated heat.
- **Modular construction** with detachable terminal blocks, hot-pluggable LCD keypad, and detachable fans for rapid maintenance. Wall, flange, floor, and lateral blade-mounting options available across the range.
- **Rigorous thermal design** validated by thermal imaging and high-temperature aging testing at 120% load / 50 °C, with multiple conformal coatings sprayed automatically for uniform protection.
- **Versatile industry applications:** lifting machinery (bridge cranes, tower cranes, hoists), metal and stone processing, cables and winding, and fluid machinery (compressors, fans, pumps).

Technical Specifications

Power and Mains Supply	
Power Range	4 kW to 560 kW
Input Voltage	Three-phase 380–480 VAC (−15% to +10%) Three-phase 480–525 VAC (−15% to +10%) Three-phase 660–690 VAC (−15% to +10%)
Input Frequency	50 Hz / 60 Hz (±5%)
Output Voltage	Three-phase, 0 V to input voltage
Efficiency	94–98% at rated load (varies by frame size and carrier frequency; larger frames achieve higher efficiency)
Input Phase Imbalance	≤ ±3%

Output and Performance	
Output Frequency	0–1 000 Hz (V/F control) | 0–500 Hz (Vector control)
Control Method	V/F Control (open-loop) | Sensorless Vector Control (SVC)
Overload Capacity	Heavy duty: 150% rated current for 60 s (Once every 10 minutes), peak 180% for 10 s Light load: 110% rated current for 60 s (Once every 10 minutes)
Starting Torque	Up to 150% rated torque at 0.5 Hz (V/F) | Up to 180% rated torque at 0.25 Hz (SVC)
Speed Control Range	1:100 (V/F) | 1:200 (SVC)
Speed Accuracy	±0.5% (SVC)
Carrier Frequency	2–12 kHz (adjustable; auto-adaptive to load and temperature)
Frequency Resolution	Digital input: 0.01 Hz | Analogue input: 0.1% of maximum frequency
Protection and Reliability	
Protection Grade	IP20 (standard) | IP55 (optional panel / cabinet installation)
Automatic Voltage Regulation	Maintains stable output voltage during input supply fluctuation
Fast Current Limiting	Minimises overcurrent faults to reduce nuisance trips
Stall Prevention	Automatic overvoltage and overcurrent stall control during accel / decel
Torque Limiting	Automatic torque limiting to prevent overcurrent faults under high-torque loads
Cooling	Forced air cooling
Ambient Temperature	−10 °C to +40 °C operating | up to +55 °C with automatic derating
Safety	Safe Torque Off (STO) compliant with IEC 61800-5-2 (SIL level dependent on system integration).
EMC Standard	IEC 61800-3 | IEC 61800-5-1
EMC Classification	C3 – Second environment (Industrial)
EMC Filter	Built-in EMC filter
Communication and I/O	
Communication – Standard	Modbus RTU (RS-485) + CANopen
Communication – Optional	Modbus TCP, PROFINET, PROFIBUS-DP, and EtherCAT (via plug-in expansion communication cards)
Digital Inputs	7 programmable digital inputs (DI1–DI7) DI7 supports high-speed pulse input up to 50 kHz
Analogue Inputs	3 analogue inputs (AI1–AI3) | 0–10 V voltage or 0–20 mA current (selectable)
Digital Outputs	2 digital outputs (DO1, DO2) – open collector DO2 supports high-speed pulse output 0–50 kHz
Analogue Outputs	2 analogue outputs (AO1, AO2) | 0–10 V or 0–20 mA (selectable)
Relay Outputs	2 relay outputs (R1, R2) | AC 250 V / 10 mA – 3 A | DC 30 V / 10 mA – 1 A

NOTE: Output frequencies above 100 Hz are intended for specialised high-speed motor applications only. Standard IEC induction motors must not be operated above their rated frequency without verifying mechanical suitability.

All specifications verified against Electrodrive ES Series Manufacturer Catalogue.
Specifications subject to change without notice.

Model Selection Table – 400 V Class

Model (Standard)	Model (AquaLogic)	Power (G)	Current	Frame	Brake	DC Reactor
ES580-01-4K0G/5K5P-3B	ES580-01-4K0G/5K5P-3B-P_01	4.0 kW	10.5 A	F1	Built-in	No
ES580-01-5K5G/7K5P-3B	ES580-01-5K5G/7K5P-3B-P_01	5.5 kW	14.5 A	F1	Built-in	No
ES580-02-7K5G/011P-3B	ES580-02-7K5G/011P-3B-P_01	7.5 kW	17.6 A	F2	Built-in	No
ES580-02-011G-3B	ES580-02-011G-3B-P_01	11 kW	25 A	F2	Built-in	No
ES580-03-015G/018P-3B	ES580-03-015G/018P-3B-P_01	15 kW	35 A	F3	Built-in	Yes
ES580-03-018G/022P-3B	ES580-03-018G/022P-3B-P_01	18.5 kW	41 A	F3	Built-in	Yes
ES580-03-022G/030P-3B	ES580-03-022G/030P-3B-P_01	22 kW	48 A	F3	Built-in	Yes
ES580-04-030G/037P-3	ES580-04-030G/037P-3-P_01	30 kW	66 A	F4	Optional	Yes
ES580-04-037G/045P-3	ES580-04-037G/045P-3-P_01	37 kW	79 A	F4	Optional	Yes
ES580-04-045G/055P-3	ES580-04-045G/055P-3-P_01	45 kW	94 A	F4	Optional	Yes
ES580-05-055G/075P-3	ES580-05-055G/075P-3-P_01	55 kW	116 A	F5	Optional	Yes
ES580-05-075G/090P-3	ES580-05-075G/090P-3-P_01	75 kW	160 A	F5	Optional	Yes
ES580-05-090G/110P-3	ES580-05-090G/110P-3-P_01	90 kW	179 A	F5	Optional	Yes
ES580-06-110G/132P-3	ES580-06-110G/132P-3-P_01	110 kW	215 A	F6	None	Yes
ES580-06-132G/160P-3	ES580-06-132G/160P-3-P_01	132 kW	259 A	F6	None	Yes
ES580-07-160G/200P-3	ES580-07-160G/200P-3-P_01	160 kW	314 A	F7	None	Yes
ES580-07-200G/220P-3	ES580-07-200G/220P-3-P_01	200 kW	387 A	F7	None	Yes
ES580-07-220G/250P-3	ES580-07-220G/250P-3-P_01	220 kW	427 A	F7	None	Yes
ES580-08-250G/280P-3	ES580-08-250G/280P-3-P_01	250 kW	481 A	F8	None	Yes
ES580-08-280G/315P-3	ES580-08-280G/315P-3-P_01	280 kW	550 A	F8	None	Yes
ES580-08-315G/355P-3	ES580-08-315G/355P-3-P_01	315 kW	616 A	F8	None	Yes
ES580-09-355G/400P-3	ES580-09-355G/400P-3-P_01	355 kW	671 A	F9	None	Yes
ES580-09-400G/450P-3	ES580-09-400G/450P-3-P_01	400 kW	759 A	F9	None	Yes
ES580-09-450G/500P-3	ES580-09-450G/500P-3-P_01	450 kW	850 A	F9	None	Yes
ES580-09-500G/560P-3	ES580-09-500G/560P-3-P_01	500 kW	950 A	F9	None	Yes
ES580-09-560G/630P-3	ES580-09-560G/630P-3-P_01	560 kW	1 060 A	F9	None	Yes

Power (G) = Heavy-duty rating. Light-duty rating encoded after "/" in model code (e.g. /5K5P = 5.5 kW). To order with AQUALOGIC, use the -P_01 code. See ES580 AquaLogic section for details. Optional expansion cards available for fieldbus communication (PROFINET, EtherCAT, Modbus TCP) — encoder interface cards are not supported on the ES580. For models 4–11 kW (frames F1–F2), an external DC bus reactor may be added if THDi compliance is required.

Model Selection Table – 525 V Class

Model (Standard)	Model (AquaLogic)	Power (G)	Current	Frame	Brake	DC Reactor
ES580-04-015G/018P-5B	ES580-04-015G/018P-5B-P_01	15 kW	27 A	F4	Built-in	Yes
ES580-04-018G/022P-5B	ES580-04-018G/022P-5B-P_01	18.5 kW	35 A	F4	Built-in	Yes
ES580-04-022G/030P-5B	ES580-04-022G/030P-5B-P_01	22 kW	45 A	F4	Built-in	Yes
ES580-04-030G/037P-5	ES580-04-030G/037P-5-P_01	30 kW	52 A	F4	Optional	Yes
ES580-05-037G/045P-5	ES580-05-037G/045P-5-P_01	37 kW	65 A	F5	Optional	Yes
ES580-05-045G/055P-5	ES580-05-045G/055P-5-P_01	45 kW	86 A	F5	Optional	Yes
ES580-05-055G/075P-5	ES580-05-055G/075P-5-P_01	55 kW	100 A	F5	Optional	Yes
ES580-06-075G/090P-5	ES580-06-075G/090P-5-P_01	75 kW	121 A	F6	Optional	Yes
ES580-06-090G/110P-5	ES580-06-090G/110P-5-P_01	90 kW	150 A	F6	Optional	Yes
ES580-07-110G/132P-5	ES580-07-110G/132P-5-P_01	110 kW	175 A	F7	None	Yes
ES580-07-132G/160P-5	ES580-07-132G/160P-5-P_01	132 kW	220 A	F7	None	Yes
ES580-07-160G/200P-5	ES580-07-160G/200P-5-P_01	160 kW	250 A	F7	None	Yes
ES580-08-200G/220P-5	ES580-08-200G/220P-5-P_01	200 kW	270 A	F8	None	Yes
ES580-08-220G/250P-5	ES580-08-220G/250P-5-P_01	220 kW	300 A	F8	None	Yes
ES580-08-250G/280P-5	ES580-08-250G/280P-5-P_01	250 kW	330 A	F8	None	Yes
ES580-09-280G/315P-5	ES580-09-280G/315P-5-P_01	280 kW	385 A	F9	None	Yes
ES580-09-315G/355P-5	ES580-09-315G/355P-5-P_01	315 kW	430 A	F9	None	Yes
ES580-09-355G/400P-5	ES580-09-355G/400P-5-P_01	355 kW	470 A	F9	None	Yes
ES580-09-400G/450P-5	ES580-09-400G/450P-5-P_01	400 kW	535 A	F9	None	Yes
ES580-09-450G/500P-5	ES580-09-450G/500P-5-P_01	450 kW	600 A	F9	None	Yes

Power (G) = Heavy-duty rating. Light-duty rating encoded after "/" in model code (e.g. /5K5P = 5.5 kW).
To order with AQUALOGIC, use the -P_01 code. See ES580 AquaLogic section for details. Optional expansion cards available for fieldbus communication (PROFINET, EtherCAT, Modbus TCP) — encoder interface cards are not supported on the ES580.

Frame Dimensions and Weight

Frame	W	H	D	A	B	d	Weight (kg)
F1	122	276	172	110	222	5.5	2.9
F2	155	292	172	140	238	6.0	3.7
F3	180	420	216	150	368	7.0	10.7
F4	255	495	221	200	479	6.5	21
F5	355	670	260	250	650	12.0	61
F6	390	790	278	357	761	11.0	90
F7	390	1 001	295	357	937	11.0	≈110
F8	537	1 305	340	490	1 280	13.0	≈190
F9	537	1 455	380	490	1 420	13.0	≈220

All dimensions in mm. W = Width, H = Height, D = Depth. A/B = Mounting hole spacing. d = Mounting hole diameter. Mounting: F1–F5 wall/flange, F6–F7 wall/floor, F8–F9 floor mounted.

Typical Applications

Industrial pumps and compressors, heavy-duty conveyors and material handling, HVAC systems and building automation, machine tools, crane and hoist applications, water treatment and municipal infrastructure, lifting machinery, cables and winding, metal and stone processing, fluid machinery.

ES580 – AquaLogic

Overview

The ES580 is available with a factory-installed AquaLogic that provides integrated multi-pump cascade control for constant-pressure water supply, irrigation, booster pump station, and HVAC pump set applications. This eliminates the need for a separate PLC or dedicated pump controller, reducing panel complexity, wiring, cost, and potential points of failure.

The AquaLogic supports two multi-drive operating architectures (Multi-follower and Multi-master) as well as a single-drive relay card mode for controlling grid-connected auxiliary pumps via contactors.

Operating Modes

Mode 1: Multi-follower (Lead-Lag)

Up to 8 variable-speed pumps, each driven by its own ES580, communicate via Modbus daisy-chain. One drive acts as the PID pressure-regulating master; auxiliary drives follow the master's speed command. When demand exceeds the master's capacity (running at maximum frequency), additional pumps are started automatically after a configurable delay. When demand falls (running at minimum frequency), pumps are shed in last-started-first-stopped order. If all auxiliary pumps are stopped and demand continues to fall, the master enters sleep mode.

Mode 2: Multi-master (Cascading PID Handoff)

Up to 8 variable-speed pumps with cascading PID handoff. When the regulating pump reaches maximum speed and cannot satisfy demand, it locks at a constant speed and hands PID regulation to the next pump. This provides smoother pressure control than single-master systems and distributes control authority across the pump set. When overcapacity is detected, pumps are shed in reverse order until only the regulating pump remains.

Mode 3: AquaLogic (External Relay Mode)

For systems using a single VSD with grid-connected auxiliary pumps, the AquaLogic relay card provides outputs to control up to 5 additional DOL pump contactors directly (1 VSD pump + up to 5 DOL pumps = 6 total).

Fixed Variable-Frequency Pump: One pump is permanently connected to the VSD output; remaining pumps (up to 5) are started/stopped direct-on-line via relay-controlled contactors.

Multi Variable-Frequency Pump: Two or more pumps can be sequentially connected to the VSD output via contactors, with remaining pumps started direct-on-line. The relay card handles the contactor switching with configurable close delay and open delay timers to prevent supply transients.

Typical Applications

Application	Configuration
Municipal water supply	2–6 × ES580 Multi-follower with pressure transducer; auto-rotation for wear equalisation
Agricultural irrigation	1 × ES580 + AquaLogic + 2–5 grid pumps via relay contactors; sleep/wake for demand-based operation
Mining dewatering	3–8 × ES580 Multi-master with cascading PID; dry-run protection for sump-level monitoring
HVAC pump sets	2–4 × ES580 Multi-follower; chilled water and condenser water circulation with band-width-based staging
Fire pump systems	1 × ES580 with Fire Mode enabled via dedicated DI; run to failure operation per fire code
Booster stations	1 × ES580 + AquaLogic with 2–3 multi-VF pumps; overpressure monitoring for pipe burst prevention

Wiring Diagram

Important: All wiring must be performed with power supply isolated and verified de-energised. Ensure DC bus voltage is below 50 V before working on any drive terminals (minimum 5-minute discharge period after power removal).

ES580 SERIES — Standard Wiring Diagram

The ES580 standard wiring diagram covers all 400 V and 525 V class models (4–560 kW). The diagram shows the main circuit loop (R/L1, S/L2, T/L3 input; U, V, W motor output; DC bus and braking terminals), the full control circuit with 7 digital inputs (DI1–DI7), 3 analogue inputs (AI1–AI3), Safe Torque Off (STO), 2 relay outputs, Modbus/CANopen, and optional expansion card slots (SLOT 1 and SLOT 2).

Terminal Group	Terminals	Function
Power Input	R/L1, S/L2, T/L3	3-phase supply — 380–480 V or 480–525 V class
Motor Output	U, V, W	3-phase output — do not connect supply power to these terminals
DC Bus / Braking	(+), (–), PB	DC bus; external braking resistor on (+) and PB terminals only
STO Safety	STO, +24V, GND	Safe Torque Off — remove +24V from STO to engage safety stop
Digital Inputs	DI1–DI7	7 programmable inputs; DI7 supports high-speed pulse to 50 kHz
Analogue Inputs	AI1, AI2, AI3	0–10 V or 0–20 mA per channel (selectable)
Analogue Outputs	AO1, AO2	0–10 V or 0–20 mA (selectable)
Digital Outputs	DO1, DO2	Open collector; DO2 supports pulse output 0–50 kHz
Relay Outputs	R1 (NO/NC/CM), R2	AC 250 V / 3 A; DC 30 V / 1 A per relay
Comms	A+/485+, A–/485–	Modbus RTU RS-485; CANopen via RJ45
Expansion	SLOT 1, SLOT 2	Optional fieldbus card (PROFINET, EtherCAT, Modbus TCP)
24 V Supply	PLC, +24V, GND	+24V max 200 mA for external devices

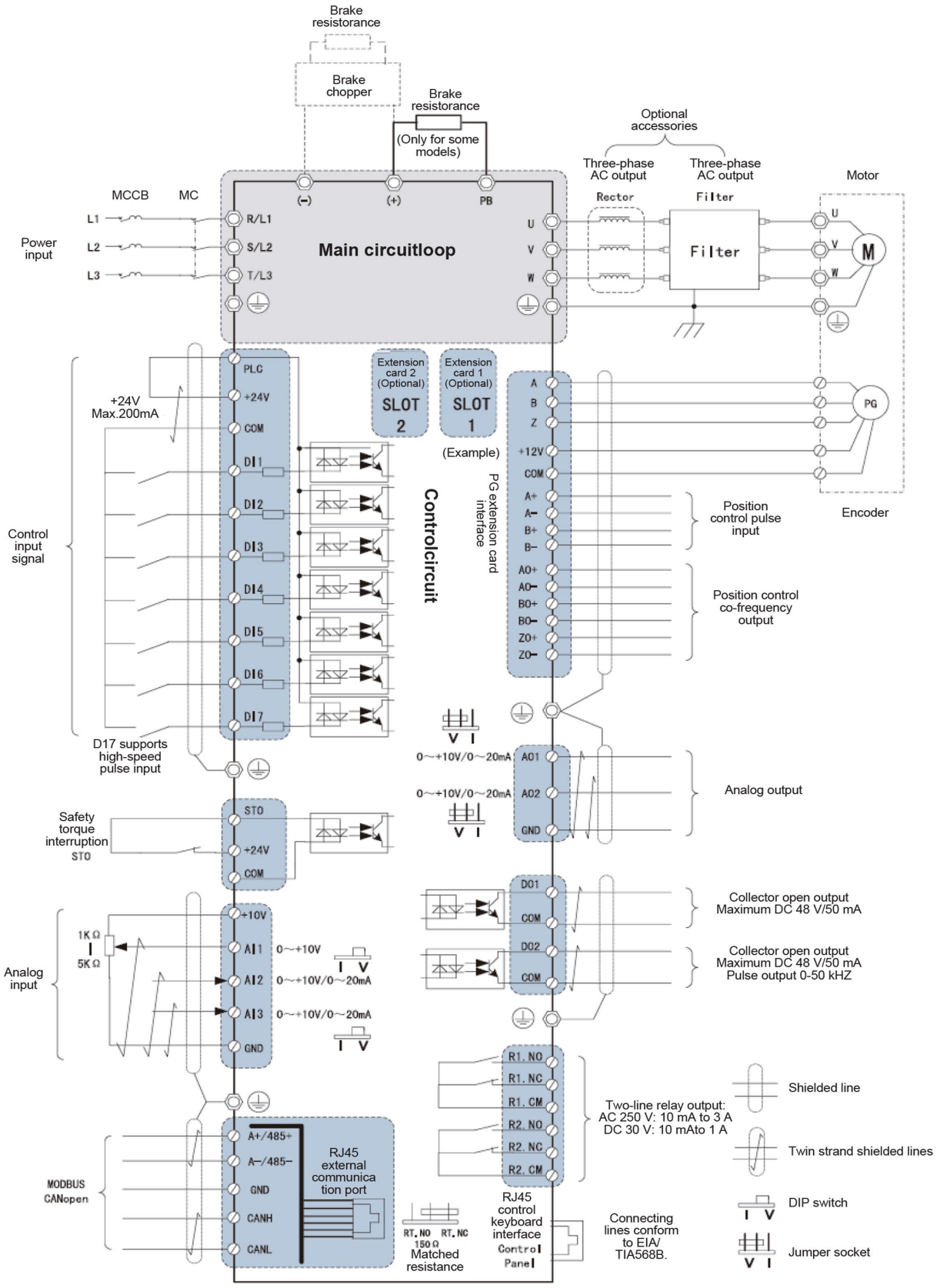


Figure 3-1 ES580 Series — Standard Wiring Diagram (400 V and 525 V Class)

NOTE: Encoder interface terminals shown are an ES850 Series feature and they do not apply to the ES580. ES580 expansion slots support Fieldbus communication cards only.

Key Pump Control Features

Feature	Specification
Maximum pumps	8 (via Modbus daisy-chain or relay card)
PID control	Built-in, with configurable setpoint, feedback source, band-width, and delay
Pressure range	0–200 bar (selectable bar/psi units)
Sleep / wake function	Pressure-based with configurable sleep level, wake level, and delay timers
Dry-run protection	Two detection methods: torque-curve based (52.09=1) and fixed-torque threshold (52.09=2)
Leak / pipe burst detection	Method 1: Sudden pressure drop threshold within detection time. Method 2: Sustained low pressure at rated speed. Configurable as alarm or fault.
Fire Mode	Mode 1: Run at set speed until failure, no alarms. Mode 2: Run at set speed, trip only on output short circuit, overvoltage, overcurrent, or phase loss.
Pre-PID function	Configurable pre-run speed and duration before PID regulation engages on initial start and wake-up
Auto-rotation	Automatic pump start sequencing by time interval (57.04=0) or minimum running hours (57.04=1)
Pump runtime logging	Individual running hours tracked per pump (up to 8 pumps), with configurable overtime alarm and fault thresholds
Overpressure monitoring	Immediate auxiliary pump shutdown if feedback exceeds configurable alarm level (57.11); regulating pump maintains normal operation
Contactor timing	Configurable close delay (57.37, default 1.0 s) and open delay (57.38, default 1.0 s) for grid-frequency pump switching
Communication	Modbus RTU daisy-chain between drives; automatic master failover to next pump ID if master is unavailable

Fire Mode

The Fire Mode function (parameter group 53) is specifically designed for fire pump and life-safety applications where the pump must continue running regardless of non-critical faults. When Fire Mode is activated via a dedicated digital input:

Mode 1: The drive runs at the configured fire speed (53.02) continuously, suppressing all fault alarms unless a critical fault occurs.

Mode 2: The drive runs at the configured fire speed but will trip only for genuinely dangerous electrical faults: output short circuit, overvoltage, overcurrent, and output phase loss. All other faults are suppressed.

In both modes, fault history is logged internally for post-incident analysis but does not interrupt pump operation. PID regulation is disabled during Fire Mode — the pump runs at the fixed fire speed.

Important: Fire Mode is intended for life-safety applications where continuous pump operation is required by building or fire codes. The drive will deliberately continue operating through conditions that would normally trigger protective shutdown. Fire Mode function does not constitute certification as a fire pump controller. For fire pump systems requiring NFPA 20 or equivalent certification, use an approved fire pump controller. Compliance with local fire regulations remains the responsibility of the system designer.

ES355PV — Solar Pumping Inverter (0.4–4 kW)

Introduction

The ES355PV series is a compact, efficient solar pumping solution designed for agricultural irrigation, livestock watering, and remote water supply. These inverters feature hybrid power input, accepting both solar PV arrays and AC grid power for 24-hour operation with MPPT efficiency up to 99.5% under steady-state conditions.

Technical Specifications

Power and Mains Supply	
Power Range	0.4–4.0 kW
AC Input (220 V models)	Single-phase or Three-phase 208–240 VAC (−15% to +10%)
AC Input (380 V model)	Three-phase 380–460 VAC (−15% to +10%)
Operating Mode	Solar PV (DC) primary – MPPT tracking | AC grid/generator standby backup
Output Voltage	220 VAC / Three-phase (220 V models) | 380 VAC / Three-phase (380 V model)
Output Frequency	0–50/60 Hz typical pump operation | Extended to 800 Hz for specialist motors
Solar PV (DC) Input	
Input Voltage	400 VDC (220 V models) | 750 VDC (380 V model)
Max Open-Circuit Voc	400 VDC (220V) | 800 VDC (380V)
PV Start-Up Voltage	200 VDC (220V) | 300 VDC (380V)
Min Operating Voltage	150 VDC (220V) | 250 VDC (380V)
Recommended DC Range	200–380 VDC (220V) | 300–750 VDC (380V)
Recommended MPP Voltage	330 VDC (220V) | 550 VDC (380V)
MPPT Tracking Efficiency	Up to 99.5% (steady-state, optimal irradiance)
Output and Performance	
Control Method	V/F | Sensorless Vector Control (SVC)
Compatible Motors	Three-phase asynchronous induction motor | PMSM
Operating Modes	Speed control | Torque control
Operator Interface	LCD + LED display with real-time metering and error indication
Metering	Output voltage, frequency, motor current, kWh, estimated water flow
Analogue Outputs	2 analogue outputs (AO1, AO2) | 0–10 V or 0–20 mA (selectable)
Relay Outputs	2 relay outputs (R1, R2) | AC 250 V / 10 mA – 3 A | DC 30 V / 10 mA – 1 A

Protection and Installation	
Protection Grade	IP20 (standard) | IP55 (optional panel / cabinet installation)
Fault Protection	30+ functions: PV over/undervoltage, low irradiance, dry-run, water level, overcurrent, overtemp, phase loss, motor overload
Water Level Detection	Auto stop on low water; auto-restart on recovery; prevents dry-running
Cooling	Fan cooling (forced air)
Altitude	Derate 1% per 100 m above 1 000 m
Installation	Wall mounting | Flange mounting
Remote Monitoring	Optional GPRS module for mobile network monitoring and remote control

WARNING: Max DC Input Voltage and Max Open-Circuit Voc ratings are identical, leaving zero safety margin at standard test conditions. PV module Voc increases by approximately 0.3–0.4%/°C below 25 °C. At a site minimum temperature of 0 °C, Voc may exceed STC values by 8–10%. Design the PV string so that Voc at the coldest expected site temperature remains below the maximum DC input voltage. Example: For a 400 VDC limit, design string Voc at STC ≤ 360 V to allow for cold-morning conditions.

Model Selection Table

Model	Power	Current	Frame	Input
ES355-B0-0K4G-1-PV	0.4 kW	2.5 A	B0	1 Ph 220 V
ES355-B0-0K7G-1-PV	0.75 kW	4.5 A	B0	1 Ph 220 V
ES355-B0-1K5G-1-PV	1.5 kW	7 A	B0	1 Ph 220 V
ES355-B0-2K2G-1-PV	2.2 kW	9 A	B0	1 Ph 220 V
ES355-B0-0K7G-3-PV	0.75 kW	2.5 A	B0	3 Ph 380 V
ES355-B0-1K5G-3-PV	1.5 kW	4 A	B0	3 Ph 380 V
ES355-B0-2K2G-3-PV	2.2 kW	5 A	B0	3 Ph 380 V
ES355-B0-4K0G-3-PV	4.0 kW	8 A	B0	3 Ph 380 V

Recommended Solar Array Configuration

Model	250 Wp Strings	250 Wp Config	300 Wp Strings	300 Wp Config	DC Bus
ES355-B0-0K4G-1-PV	1	10 × 1	1	9 × 1	400 VDC
ES355-B0-0K7G-1-PV	1	10 × 1	1	9 × 1	400 VDC
ES355-B0-1K5G-1-PV	1	10 × 1	1	9 × 1	400 VDC
ES355-B0-2K2G-1-PV	1	10 × 1	1	9 × 1	400 VDC
ES355-B0-0K7G-3-PV	1	18 × 1	1	15 × 1	800 VDC
ES355-B0-1K5G-3-PV	1	18 × 1	1	15 × 1	800 VDC
ES355-B0-2K2G-3-PV	1	18 × 1	1	15 × 1	800 VDC
ES355-B0-4K0G-3-PV	1	20 × 1	1	16 × 1	800 VDC

Configuration for modules with Voc 37 ± 1 V (250 Wp) and 45 ± 1 V (300 Wp). Format: modules per string × strings.
Configurations shown are based on STC (25 °C). Voc increases at low temperatures — design string Voc at ≤ 90% of max DC input voltage to maintain cold-morning safety margin. Refer to the warning on this page for guidance.

Dimensions and Weight

Frame	W (mm)	H (mm)	D (mm)	A (mm)	B (mm)	kg
B0	68	190	147	53	180	1.5

Wiring Diagram

Important: All wiring must be performed with power supply isolated and verified de-energised. Ensure DC bus voltage is below 50 V before working on any drive terminals (minimum 5-minute discharge period after power removal).

ES355 SERIES — Standard Wiring Diagram

The ES355PV solar pump wiring diagram shows the PV application connection. PV panels connect via isolation switch Q1 to the DC bus; grid or generator backup connects via contactor Q2 to AC input terminals L1, L2, L3. RUN/STOP is wired to digital input DI1. A water level sensor connects to the analogue inputs (AI1/AI2 via +10V/COM) for tank level control. Motor output terminals U, V, W connect to the pump. Additional outputs include digital output DO1, relay output R1A/R1B/R1C, analogue output AO, and RS-485 (485+/485−) for Modbus communication.

Terminal Group	Terminals	Function
AC Power Input	L1, L2, L3	AC input L1/L2/L3 from grid or generator backup via contactor Q2; DC bus connects directly from PV panels via isolation switch Q1
Motor Output	U, V, W	3-phase AC output to pump motor — U, V, W
24 V Supply	24V(+24V), COM	+24V output for external devices (max. 200 mA); COM = signal common
Digital Inputs	DI1–DI4	DI1 = RUN/STOP command; DI2–DI4 available for additional control (sleep, fault reset, etc.); DI4 supports high-speed pulse to 60 kHz
Analogue Input	AI1, AI2, +10V, COM	AI1 = water level sensor signal via +10V/AI1/COM; 0–10 V or 0–20 mA (jumper J6 selectable)
Analogue Output	AO, COM	AO: 0–10 V or 0–20 mA output (jumper selectable); programmable monitoring output
Digital Output	DO1, COM	DO1: open collector output, max DC 48 V / 50 mA; pulse output 0–50 kHz
Relay Output	NO, NC, CM	R1A/R1B/R1C: 1-line relay output; AC 250 V: 10 mA–3 A; DC 30 V: 10 mA–1 A
RS-485 / Modbus	A+(485+), A–(485–)	Modbus RTU standard communication
CAN / Keyboard	RJ45 panel port	LCD keypad panel port (RJ45); CANopen pins 1-CANH, 2-CANL, 6/7/8-GND
EMC Grounding	J7 jumper	EMC grounding configuration — see jumper illustration on diagram

Solar PV Input Note: The PV panels connect directly to the DC bus via isolation switch Q1 (positive and negative rails). Grid or generator backup connects via contactor Q2 to AC input terminals L1, L2, L3. The drive automatically switches between PV and grid/generator sources. Design PV string Voc at STC W≤ 90% of the max DC input voltage to allow for cold-morning Voc rise.

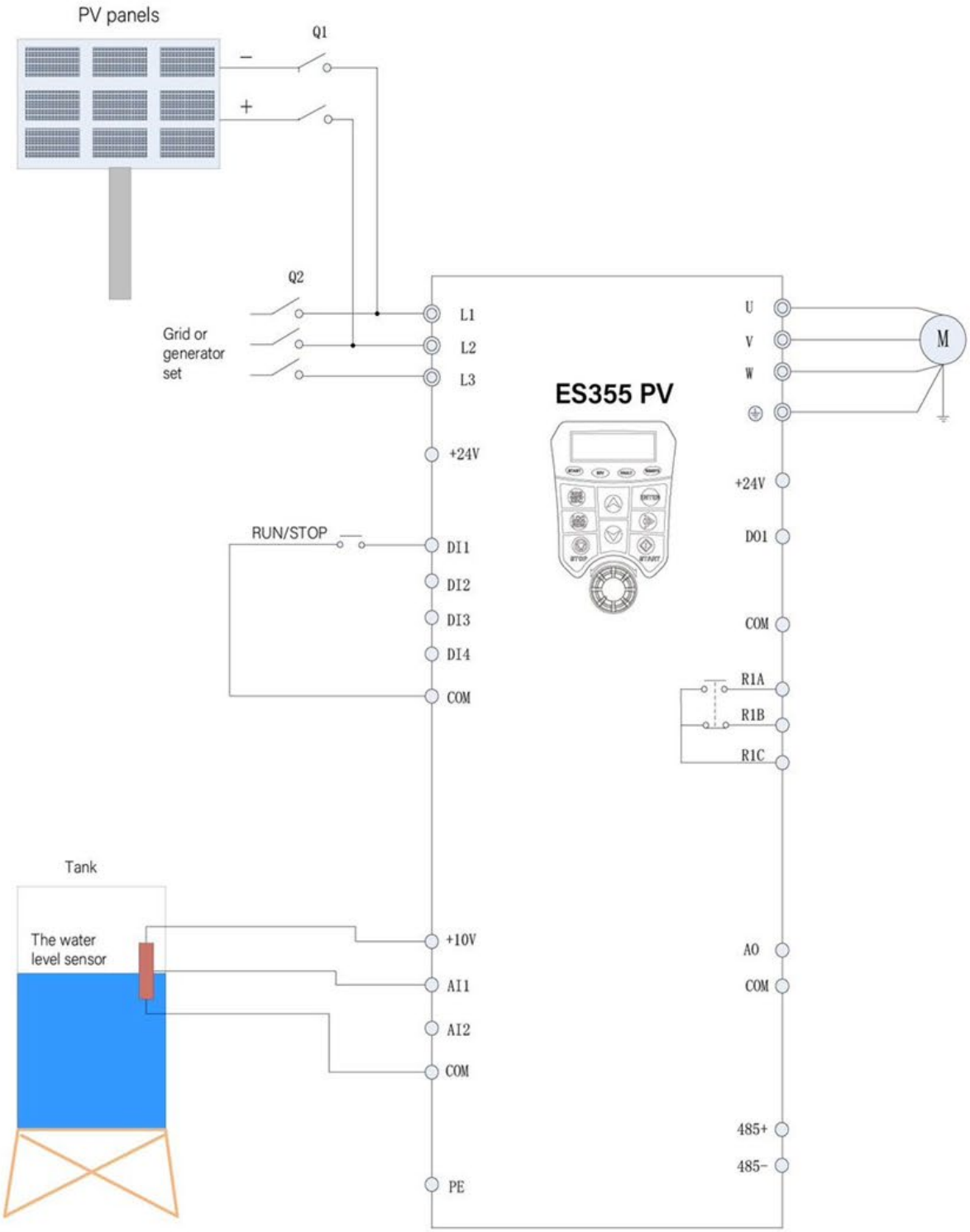


Figure 4-1 ES355PV Solar Pumping Inverter — Wiring Diagram

ES560PV — Solar Pumping Inverter (4–132 kW)

Introduction

The ES560PV series extends solar pumping capabilities to higher power applications from 4 kW to 132 kW. Supporting 800 VDC / 380 VAC configuration, these inverters enable large-scale agricultural irrigation, municipal water supply, and industrial fluid handling with hybrid solar/grid operation.

Technical Specifications

Power and Mains Supply	
Power Range	4.0–132 kW
AC Input (380V)	Three-phase 380–460 VAC (−15% to +10%)
Operating Mode	Solar PV (DC) primary – MPPT tracking | AC grid/generator standby
Output Voltage	380 VAC / Three-phase
Output Frequency	0–800 Hz (V/F Control)
Solar PV (DC) Input	
Input Voltage	750 VDC (380 V model)
Max Open-Circuit Voc	800 VDC (380V)
PV Start-Up Voltage	300 VDC (380V)
Min Operating Voltage	250 VDC (380V)
Recommended DC Range	300–750 VDC (380V)
Recommended MPP Voltage	550 VDC (380V)
MPPT Tracking Efficiency	Up to 99.5% (steady-state, optimal irradiance)
Output and Performance	
Control Method	V/F | Sensorless Vector Control (SVC)
Compatible Motors	Three-phase asynchronous induction motor | PMSM
Operating Modes	Speed control | Torque control
Operator Interface	LCD + LED display with real-time metering and error indication
Metering	Output voltage, frequency, motor current, kWh, estimated water flow
Analogue Outputs	2 analogue outputs (AO1, AO2) | 0–10 V or 0–20 mA (selectable)
Relay Outputs	2 relay outputs (R1, R2) | AC 250 V / 10 mA – 3 A | DC 30 V / 10 mA – 1 A
Protection and Installation	
Protection Grade	IP20 (standard) | IP55 (optional panel / cabinet installation)
Fault Protection	30+ functions: PV over/undervoltage, low irradiance, dry-run, water level, over-current, overtemp, phase loss, motor overload
Water Level Detection	Auto stop on low water; auto-restart on recovery; prevents dry-running
Cooling	Fan cooling (forced air)
Altitude	Derate 1% per 100 m above 1 000 m
Installation	Wall mounting | Flange mounting
Remote Monitoring	Optional GPRS module for mobile network monitoring and remote control

Model Selection – 800 VDC / 380 VAC Class

Model	Power	Current	Frame	Brake
ES560-01-4K0G/5K5P-3B-PV	4.0 kW	14.5 A	B1	Built-in
ES560-01-5K5G/7K5P-3B-PV	5.5 kW	17.5 A	B1	Built-in
ES560-01-7K5G/011P-3B-PV	7.5 kW	25 A	B1	Built-in
ES560-02A-011G/015P-3B-PV	11 kW	35 A	B2A	Built-in
ES560-02A-015G/018P-3B-PV	15 kW	38.6 A	B2A	Built-in
ES560-03-018G/022P-3B-PV	18.5 kW	46 A	B3	Built-in
ES560-03-022G/030P-3B-PV	22 kW	61 A	B3	Built-in
ES560-04-030G/037P-3-PV	30 kW	75 A	B4	None
ES560-04-037G/045P-3-PV	37 kW	91 A	B4	None
ES560-04-045G/055P-3-PV	45 kW	115 A	B4	None
ES560-05-055G/075P-3-PV	55 kW	155 A	B5	None
ES560-05-075G/090P-3-PV	75 kW	178 A	B5	None
ES560-05-090G/110P-3-PV	90 kW	215 A	B5	None
ES560-06-110G/132P-3-PV	110 kW	261 A	B6	None
ES560-06-132G/160P-3-PV	132 kW	310 A	B6	None

Dimensions and Weight

Frame	W (mm)	H (mm)	D (mm)	A (mm)	B (mm)	d (mm)	kg
B1	122	276	172	110	222	6.0	3.7
B2A	175	336	192	160	296	6.0	5.1
B3	180	420	216	150	368	7.0	12.6
B4	225	495	221	200	479	6.5	22
B5	355	670	260	250	650	12.0	65
B6	390	790	278	357	761	11.0	90

All dimensions in mm. W = Width, H = Height, D = Depth. A/B = Mounting hole spacing. d = Mounting hole diameter.
Mounting: B1–B6 wall/flange

Wiring Diagram

Important: All wiring must be performed with power supply isolated and verified de-energised. Ensure DC bus voltage is below 50 V before working on any drive terminals (minimum 5-minute discharge period after power removal).

ES560 SERIES — Standard Wiring Diagram

The ES560/610 PV solar pump wiring diagram shows the application connection for three-phase models. PV panels connect via diodes and isolation switch Q1 to the DC bus (+)/(-)/PB; grid or generator backup connects via contactor Q2 to three-phase AC input terminals R, S, T. RUN/STOP and PV Voltage Given selection are wired to digital inputs DI1 and DI2. The water level sensor connects to analogue inputs AI1/AI2/AI3 (via +10V/GND) for tank level control. Motor output terminals U, V, W connect to the pump. Additional outputs include two digital outputs DO1/DO2, two relay outputs R1A/R1B/R1C and R2A/R2B/R2C, two analogue outputs AO1/AO2, and RS-485 (485+/485−/GND) for Modbus communication.

Terminal Group	Terminals	Function
AC / PV Input	R/L1, S/L2, T/L3	AC input R/S/T from grid or generator backup via contactor Q2; PV panels connect to DC bus via diodes and isolation switch Q1
Motor Output	U, V, W	3-phase AC output U, V, W to pump motor
DC Bus / Braking	(+), (–), PB	DC bus terminals; external braking resistor on (+) and PB only — do NOT connect resistor across (+) and (–)
STO Safety	STO, +24V, GND	Safe Torque Off — remove +24 V from STO input to engage safety stop; both STO inputs must be wired
Digital Inputs	DI1–DI7	DI1 = RUN/STOP; DI2 = PV Voltage Given selection; DI3–DI7 available for additional pump control; DI17/HI supports high-speed pulse input
Analogue Inputs	AI1, AI2, AI3	AI1 = water level sensor signal (+10V/AI1/COM); AI2 and AI3 available; 0–10 V or 0–20 mA selectable per channel
Analogue Outputs	AO1, AO2	AO1, AO2: 0–10 V or 0–20 mA outputs; GND reference provided
Digital Outputs	DO1, DO2	Open collector outputs; DO2 supports pulse output 0–50 kHz
Relay Outputs	R1A/R1B/R1C, R2A/R2B/R2C	R1A/R1B/R1C and R2A/R2B/R2C: 2-line relay outputs; AC 250 V / 3 A; DC 30 V / 1 A
RS-485 / Modbus	485+, 485−, GND	Modbus RTU RS-485 communication; 485+/485−/GND terminals
Expansion Slots	SLOT 1, SLOT 2	Optional encoder card or fieldbus card (PROFINET, EtherCAT, Modbus TCP)
24 V Supply	PLC, +24V, GND	+24V/PLC output max. 200 mA for external sensors; COM = signal common

Solar PV DC Input Note: The ES560PV solar PV input (up to 800 VDC open-circuit) connects to dedicated DC bus terminals separate from the AC input. The MPPT controller tracks maximum power point automatically. In hybrid mode, the drive automatically switches between solar PV and AC grid/generator supply. Design PV string Voc at STC ≤ 90% of 800 VDC (i.e. ≤ 720 V at STC) to allow for cold-morning Voc rise. Refer to Section 5 recommended solar array configuration table for string sizing guidance.

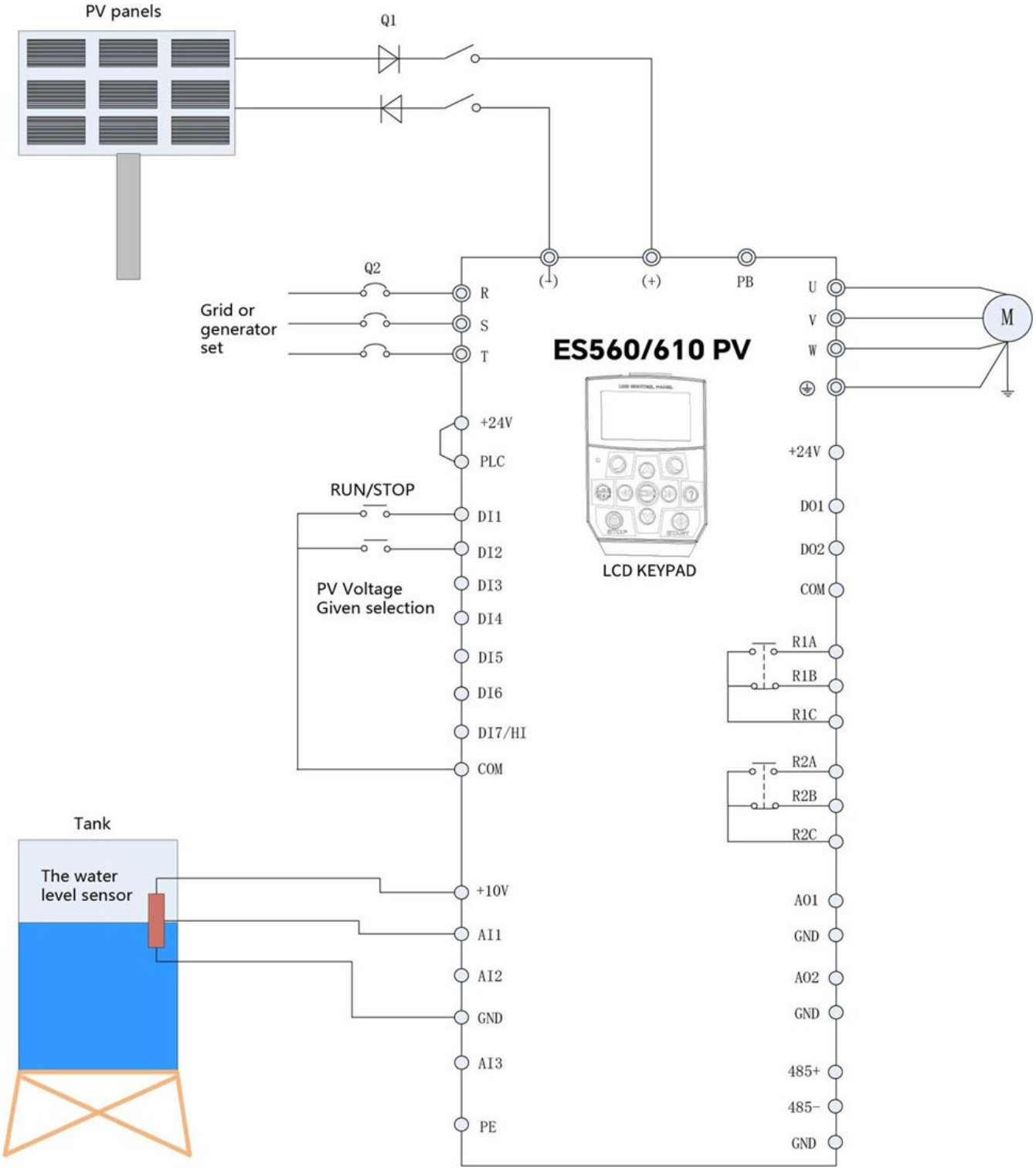
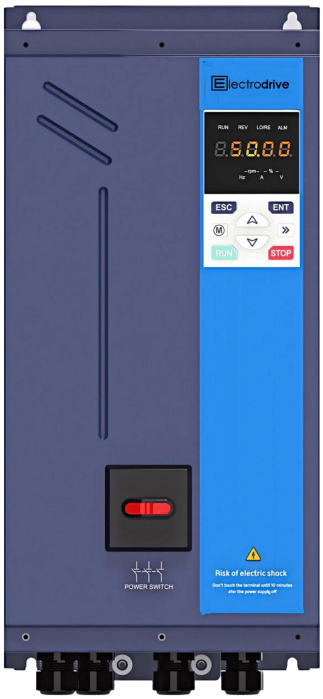


Figure 5-1 ES560/610 PV — Solar Pump PV Wiring Diagram

VFD510 — High Protection Grade IP55 Inverter

Introduction

The VFD510 series is a specialised high-protection inverter with IP55 rating, designed for demanding environments where dust, moisture, and contaminants are present. Featuring STO safety functionality, dual motor support (asynchronous and PMSM), and comprehensive encoder interfaces, these drives excel in mining, chemical processing, water treatment, food and beverage, and outdoor installations.



Key Features

IP55 protection per IEC 60529. STO per IEC 61800-5-2. V/F, SVC, and FOC modes. Speed range 1:100 (V/F) | 1:200 (SVC) | 1:1000 (FOC). Starting torque 150% at 0.5 Hz (V/F), 0.25 Hz (SVC), 0 Hz (FOC with encoder). Standard Modbus RTU; optional CANopen, PROFINET, Modbus TCP. Built-in braking on SIZE A–B, optional on SIZE C–D.

Technical Specifications

Power and Mains Supply	
Power Range	2.2 kW to 45 kW
Input Voltage	Three-phase: 380–480 VAC (−15% to +10%)
Input Frequency	50 Hz or 60 Hz (±5%)
Output Voltage	Three-phase, 0 V–Input Voltage
DC Reactor	External connection on Size C+ (from 15 kW)
Output and Performance	
Control Method	V/F | SVC | FOC (with encoder)
Output Frequency	0–600 Hz (V/F) | 0–200 Hz (SVC) | 0–400 Hz (FOC)
Frequency Resolution	Digital: 0.01 Hz | Analogue: 0.1% of max frequency
Carrier Frequency	1–12 kHz (adjustable)
Overload Capacity	Heavy Duty: 150% for 60 s | Light Load: 120% for 60 s
Starting Torque	150% at 0.5 Hz (V/F) | 150% at 0.25 Hz (SVC) | 150% at 0 Hz (FOC – encoder required)
Torque Accuracy	SVC: ±10% below 5 Hz, ±5% above 5 Hz | FOC: ±3.0%
Speed Range	1:100 (V/F) | 1:200 (SVC) | 1:1000 (FOC)
Speed Accuracy	±0.5% (V/F) | ±0.2% (SVC) | ±0.02% (FOC)
Speed Response	5 Hz (V/F) | 20 Hz (SVC) | 50 Hz (FOC)
Accel / Decel	Linear and S-curve; 4 groups; 0–60 000 s
Advanced Functions	Jogging, droop, 16-speed preset, PID, sleep/wake, simple PLC, virtual I/O, fault retry, dual motor switching
Protection and Reliability	
Protection Grade	IP55 (standard)
Motor Protection	Phase loss, overcurrent, overvoltage, undervoltage, overtemp, ground fault, motor overload

Cooling	Forced air cooling
Ambient Temp	−10 °C to +40 °C | Max 50 °C with derating (1.5%/°C)
Storage Temp	−20 °C to +60 °C
Humidity	< 95% RH (non-condensing)
Altitude	Derate 1% per 100 m above 1 000 m
Vibration	< 5.9 m/s² (0.6 g)
Communication and I/O	
Standard Comms	Modbus RTU (RS-485)
Optional Comms	CANopen | PROFINET | Modbus TCP
Encoder (Optional)	ABZ incremental | Resolver interface
Digital Inputs	5 × DI (DI5: 50 kHz pulse)
Analogue Inputs	2 × AI (0–10 V / 0–20 mA)
Digital Outputs	1 × DO + 1 × pulse (50 kHz)
Analogue Outputs	2 × AO (0–20 mA / 0–10V)
Relay Outputs	2 × relay (R1, R2)
Operator Panel	LED keypad standard | LCD optional

NOTE: FOC mode requires an optional encoder interface card (ABZ or resolver). Without encoder, only V/F and SVC modes are available.

Model Selection Table

Model	Power	Current	Size	Brake	Safety
VFD510-2R2-T4B	2.2 kW	5.6 A	A	Built-in	STO
VFD510-4R0-T4B	4.0 kW	9.4 A	A	Built-in	STO
VFD510-5R5-T4B	5.5 kW	13 A	A	Built-in	STO
VFD510-7R5-T4B	7.5 kW	17 A	B	Built-in	STO
VFD510-011-T4B	11 kW	25 A	B	Built-in	STO
VFD510-015-T4B	15 kW	32 A	B	Built-in	STO
VFD510-018-T4B	18.5 kW	37 A	C	Built-in	STO
VFD510-022-T4B	22 kW	45 A	C	Built-in	STO
VFD510-030-T4	30 kW	60 A	C	Optional	STO
VFD510-037-T4	37 kW	75 A	D	Optional	STO
VFD510-045-T4	45 kW	90 A	D	Optional	STO

Dimensions and Weight

Size	W (mm)	H (mm)	D/D1	A (mm)	B (mm)	Φd	Screw
A	160	400	195/230	128	372	Φ6	M5
B	200	445	210/245	165	408	Φ6	M5
C	235	515	210/245	200	470	Φ7	M6
D	334	595	265/293	250	550	Φ10	M8

D = Depth without cover, D1 = Depth with cable gland. Models 15 kW+ reserve external DC reactor positions.

Wiring Diagram

Important: All wiring must be performed with power supply isolated and verified de-energised. Ensure DC bus voltage is below 50 V before working on any drive terminals (minimum 5-minute discharge period after power removal).

VFD510 Series — Main Circuit Wiring Diagram

The VFD510 IP55 inverter main circuit wiring diagram shows the recommended installation arrangement including the upstream circuit breaker (MCCB), electromagnetic contactor, optional input-side AC reactor, optional EMC filter, the drive's L1/L2/L3 power input and U/V/W motor output terminals, optional braking unit with external braking resistor, and optional output-side AC reactor. The IP55 enclosure requires cable entry via the gland plate at the base of the unit.

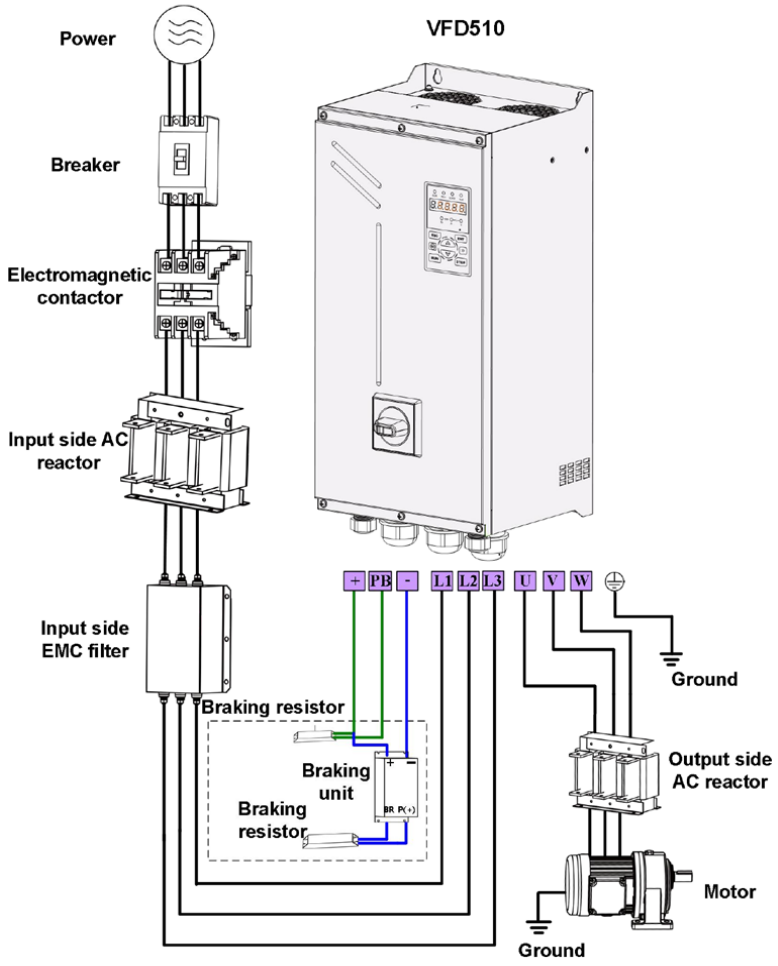


Figure 6-1 VFD510 Series — Main Circuit Wiring Diagram (Source: VFD510 User Manual V1.0)

VFD510 Series — Control Circuit Wiring Diagram

The VFD510 control circwuit terminal diagram shows the digital input terminals (DI1–DI4 and high-speed input HDI), analogue inputs (AI1, AI2 — 0–10 V / 0–20 mA), analogue outputs (AO1, AO2), digital open-collector outputs (DO1, HDO), Safe Torque Off (STO) inputs (H1, H2, HC) with DM+/DM– STO output, two relay outputs (T1A/B/C, T2A/B/C), RS-485 Modbus (485+/485–), J3 encoder expansion slot, and J4 IO/ communication expansion slot.

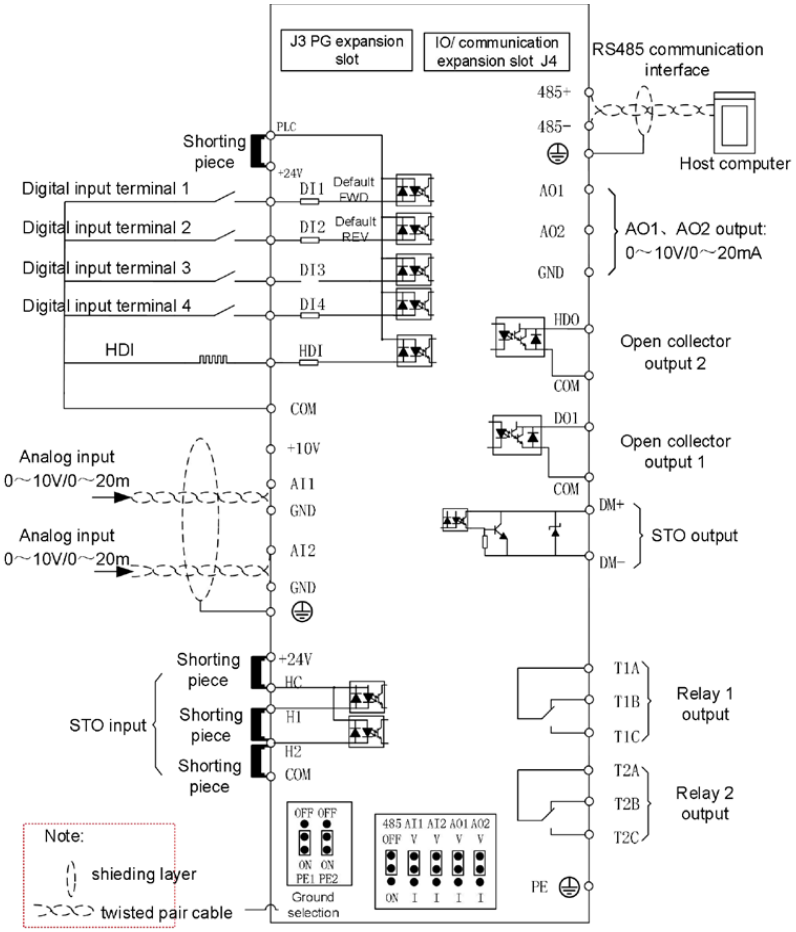


Figure 6-2 VFD510 Series — Control Circuit Terminal Wiring Diagram (Source: VFD510 User Manual V1.0)

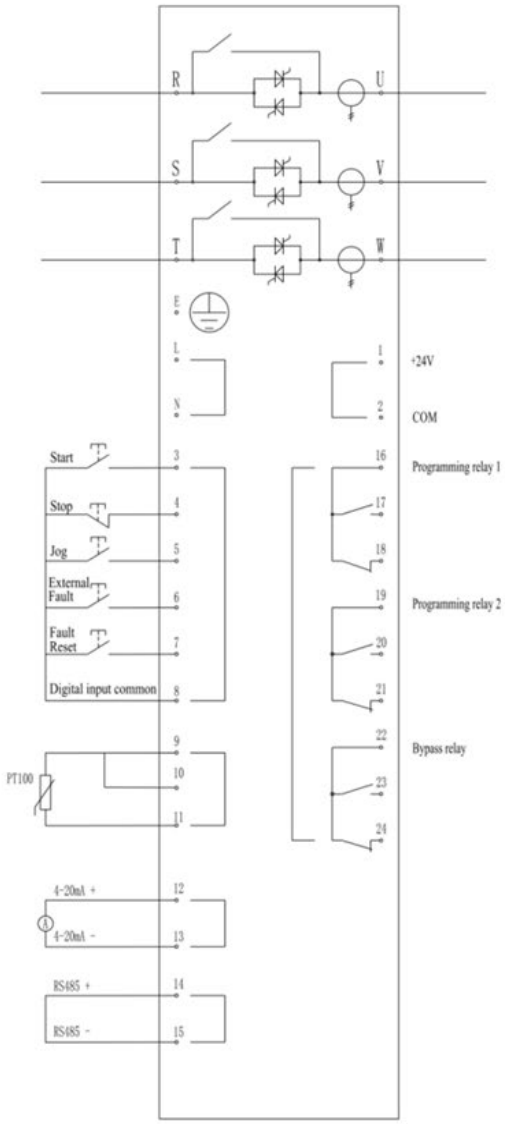
Terminal Group	Terminals	Function
Digital Inputs	DI1–DI4, HDI	4 programmable DI + 1 high-speed input (HDI) to 50 kHz; PLC shorting piece for +24 V source
Analogue Inputs	AI1, AI2	0–10 V or 0–20 mA per channel; jumper configured on IO board
Analogue Outputs	AO1, AO2	0–10 V or 0–20 mA; jumper configured on IO board
Digital Outputs	DO1, HDO	DO1: open collector; HDO: high-speed pulse output
STO Input	H1, H2, HC, COM	Safe Torque Off — H1/H2 to +24 V (HC) to enable; remove to engage STO
STO Output	DM+, DM–	STO status output for safety monitoring circuit
Relay 1	T1A, T1B, T1C	C/O relay — AC 250 V / 3 A; DC 30 V / 1 A
Relay 2	T2A, T2B, T2C	C/O relay — AC 250 V / 3 A; DC 30 V / 1 A
RS-485 / Modbus	485+, 485–	Modbus RTU standard; CANopen optional via J4 expansion
Encoder (Optional)	J3 PG slot	ABZ incremental or resolver interface card — required for FOC mode
Comms (Optional)	J4 IO slot	PROFINET, CANopen, or Modbus TCP expansion card
Ground	PE	Protective earth — mandatory connection

Wiring Note: STO terminals H1 and H2 are bridged to HC (+24V) via shorting pieces at factory, allowing the drive to run without a safety controller. For applications requiring STO functionality, remove the shorting pieces and wire STO input from an appropriate safety controller. Removing the shorting pieces without connecting a safety controller will prevent the drive from running.

Source: VFD510 High Protection Level Frequency Inverter User Manual V1.0. Wiring diagrams reproduced for reference in the Electrodrive product catalogue. For complete installation guidance including cable sizing, terminal torque specifications, and precautions, refer to the full VFD510 user manual.

VKS8000 Series — Motor Soft Starter Wiring Diagram

The VKS8000 wiring diagram shows the three-phase power circuit (RST supply input to UVW motor output) with built-in bypass relay, the single-phase control supply (L/N, 220–240 VAC), and all 24 control terminals including the 24 V DC output, Start/Stop/Jog/External Fault/Reset digital inputs, PT100 motor thermistor inputs (9–11), 4–20 mA analogue output (12–13), RS-485 Modbus RTU communication (14–15), two programmable output relays (16–21), and the built-in bypass relay contacts (22–24). Note: the current transformer is located at the output side of the soft starter.



Terminal type		Terminal number	Terminal name	Description
Master Back to Way		RST	Power input	Soft starter three-phase AC power input
		UVW	Soft starter output	Connect three-phase asynchronous motor
		R1S1T1	Bypass contactor terminal	Used to connect the bypass contactor. Only external The bypass type soft starter has this terminal, inside Set bypass type and thyristor on-line soft start Actuator without this terminal
Power input		L	Power input L	220V-440V control power input
		N	Power input N	
Control System Back to Way	24V output	1	+24V	DC 24V output, maximum current 100mA
		2	COM	
	Number Word Lose Out	3	Start	Can be started by short-circuiting with the common terminal (6) Moving soft starter
		4	Stop	Can be stopped when disconnected from the common terminal (6) Stop soft starter
		5	Moving point	Short-circuit with the common termina (6) to jog Starting soft starter
		6	External fault	Short-circuit with common terminal (6) for soft start Shutdown
		7	Fault reset	Shorted to the common terminal (6) in case of failureCan clear the fault state
		8	Digital input common terminal	Digital input terminal common
	Analog input	9	Motor temperature sensor input A	Pt100
		10	Motor temperature sensor input B	
		11	Motor temperature sensor com	
	Analog output	12	4-20mA output positive	4-20mA output, 20m A corresponding current can pass Parameter E08, E09 adjustment
		13	4-20mA output negative	
	Communication	14	Rs485+	For ModBusRTU communication
		15	Rs485-	
	Programming relay 1	16	Programming relay 1 common	Programmable output, you can choose from the following functions: 0. No action 1. Power on action 2. Soft start action 3. Bypass action 4. Action in soft stop 5. Action in jog 6. Action during operation 7. Standby action 8. Failure action 9. Thyristor breakdown action 10. The current is greater than the reached value 1 11. The current is greater than the reached value 2 12. The current is less than the reached value 1 13. The current is less than the reached value 2
		17	Programming relay 1 normally open	
		18	Programming relay 1 normally closed	
	Programming relay 2	19	Programming relay 2 common	
		20	Programming relay 2 normally open	
		21	Programming relay 2 normally closed	
	Bypass relay	22	Bypass relay common	Pull-in during bypass operation
		23	Bypass relay normally open	
		24	Bypass relay normally closed	

Figure VKS-1 VKS8000 Series — Soft Starter Wiring Diagram (Source: VKS8000 User Manual, Section 4.10)

VKS8000 Series — Control Terminal Functions

Terminal Group	Terminals	Function
Power Input	R, S, T	3-phase 220–690 VAC supply input to soft starter
Motor Output	U, V, W	3-phase output to motor — do not connect supply power here
Control Supply	L, N	Single-phase control power input, 220–240 VAC (A1, A2)
24 V Supply	1, 2 (+24V, COM)	Internal +24 VDC output for external use; max. 100 mA
Digital Inputs	3–8	Start (3), Stop (4), Jog (5), External Fault (6), Fault Reset (7); terminal 8 = digital input common (COM)
Motor Thermistor	9, 10, 11	PT100 motor temperature sensor inputs (A, B) and common; enable via parameter C11
Analogue Output	12, 13	4–20 mA analogue output (+/−); programmable via parameters E08/E09
RS-485 / Modbus	RS485+, RS485−	Modbus RTU RS-485 two-wire communication (terminals 14 and 15)
Programmable Relays	16–21	Two programmable output relays (COM/NO/NC each); function set via parameters E00 and E02 — options include fault, run, bypass, soft-start, and current threshold actions
Bypass Relay	22, 23, 24	Built-in bypass relay contacts (COM/NO/NC) — pulls in automatically at full speed; bypasses thyristors during run

Source: VEIKONG VKS8000 Built-in Bypass Motor Soft Starter User Manual. Wiring diagram reproduced for reference in the Electrodrive product catalogue. For complete installation guidance including cable sizing, terminal torque specifications, and precautions, refer to the full VKS8000 user manual.

VKS8000 Series — Motor Soft Starters

IMPORTANT: The VKS8000 is a MOTOR SOFT STARTER, not a Variable Speed Drive.

✓ Provides controlled soft starting and stopping, reduces mechanical stress
✓ High efficiency during running via built-in bypass contactor
✗ Does NOT provide variable speed control – motor runs at line frequency only
✗ No speed regulation, no PID control, no energy savings from speed reduction

Choose VKS8000 when: Fixed speed with soft start/stop is acceptable

Choose VSD when: Variable speed, energy savings, or process control is required

Technical Specifications

Power and Mains Supply	
Power Range	11–500 kW
Main Supply Voltage	Three-phase 220–690 VAC (−15% to +10%)
Supply Frequency	50 Hz / 60 Hz
Control Supply	220–240 VAC (terminals L, N)
Motor Connection	Star (3-wire) | Delta (6-wire) – selectable via F02
Internal Bypass	Built-in bypass contactor on all models; bypasses thyristors at full speed
Starting and Stopping Control	
Starting Methods	Five modes: Voltage Ramp, Current Limit, Torque Start, Kick Start, Direct Start
Stopping Methods	Three modes: Free Coasting, Voltage Soft Stop, DC Brake Stop
Starting Time	Adjustable via parameter A05
Initial Voltage	Adjustable % of rated (A04); closed-loop min: 37%
Current Limit	Adjustable % of rated motor current (A03)
Jog Function	Via terminal input or keyboard
Motor Changeover	Sequential switching via programmable relay outputs
Protection and Reliability	
Motor Thermal	Electronic thermal overload model + Pt100 RTD input (terminals 9, 10, 11)
Thyristor Protection	Over-temperature trip + breakdown detection
Supply Monitoring	Phase loss, phase sequence, over/undervoltage
Current Monitoring	Three-phase imbalance + overcurrent protection
Additional	Ground fault, external fault input (terminal 6), comms timeout
Fault Record	Last 10 events with fault type, voltage, currents, run time
Protection Grade	IP20 (standard) | IP55 (Standard – Built-in cabinet)
Cooling	Natural convection (passive) – thyristors inactive during bypass
Ambient Temp	−10 °C to +40 °C
Humidity	≤ 95% RH (non-condensing)

Altitude	Derate 1% per 100 m above 1 000 m
Control, I/O and Communication	
Display	4-line backlit LCD; real-time status, currents, voltage, PF, temp, starts, run time
Control Source	8 combinations: keyboard, terminal, comms, or mixed
Digital Inputs	5 inputs (terminal 8 common): Start(3), Stop(4), Jog(5), Ext Fault(6), Reset(7)
24 VDC Output	Terminals 1–2 | max 100 mA
Temp Input	Pt100 RTD (terminals 9, 10, 11)
Analogue Output	4–20 mA (terminals 12–13); function via E08/E09
Relay Outputs	2 × programmable (C/O): Relay 1 (16,17,18), Relay 2 (19,20,21); 13 functions
Bypass Relay	Dedicated (terminals 22, 23, 24); closes at full speed
Communication	RS-485 Modbus RTU (terminals 14, 15); full remote control

Model Selection – 400 V Class

Model	Power	Rated Thyristor Current – Star (A)	Max. Motor Line Current – Delta (A)
VKS8000-7.5-T4	7.5 kW	15 A	26 A
VKS8000-011-T4	11 kW	22 A	37 A
VKS8000-015-T4	15 kW	30 A	51 A
VKS8000-018-T4	18.5 kW	37 A	60 A
VKS8000-022-T4	22 kW	44 A	74 A
VKS8000-030-T4	30 kW	60 A	102 A
VKS8000-037-T4	37 kW	74 A	126 A
VKS8000-045-T4	45 kW	90 A	150 A
VKS8000-055-T4	55 kW	110 A	180 A
VKS8000-075-T4	75 kW	150 A	255 A
VKS8000-090-T4	90 kW	180 A	306 A
VKS8000-110-T4	110kW	230A	375 A
VKS8000-132-T4	132 kW	264 A	448 A
VKS8000-160-T4	160 kW	320 A	544 A
VKS8000-185-T4	185 kW	370 A	629 A
VKS8000-200-T4	200 kW	400 A	680 A
VKS8000-220-T4	220 kW	440 A	748 A
VKS8000-250-T4	250 kW	500 A	850 A
VKS8000-280-T4	280 kW	560 A	952 A
VKS8000-320-T4	320 kW	640 A	1 088 A
VKS8000-400-T4	400 kW	800 A	1 360 A
VKS8000-450-T4	450 kW	900 A	1 530 A
VKS8000-500-T4	500 kW	1 000 A	1 700 A

Model Selection – 525 V Class

Model	Power	Rated Thyristor Current – Star (A)	Max. Motor Line Current – Delta (A)
VKS8000-011-T6	11 kW	15 A	22 A
VKS8000-015-T6	15 kW	22 A	37 A
VKS8000-018-T6	18.5 kW	30 A	51 A
VKS8000-022-T6	22 kW	37 A	60 A
VKS8000-030-T6	30 kW	44 A	74 A
VKS8000-037-T6	37 kW	60 A	102 A
VKS8000-045-T6	45 kW	74 A	126 A
VKS8000-055-T6	55 kW	90 A	150 A
VKS8000-075-T6	75 kW	110 A	180 A
VKS8000-090-T6	90 kW	150 A	255 A
VKS8000-110-T6	110 kW	180 A	306 A
VKS8000-132-T6	132 kW	220 A	370 A
VKS8000-160-T6	160 kW	264 A	448 A
VKS8000-185-T6	185 kW	320 A	544 A
VKS8000-200-T6	200 kW	320 A	544 A
VKS8000-220-T6	220 kW	320 A	544 A
VKS8000-250-T6	250 kW	370 A	629 A
VKS8000-280-T6	280 kW	440 A	748 A
VKS8000-320-T6	320 kW	500 A	850 A
VKS8000-400-T6	400 kW	640 A	1 088 A
VKS8000-450-T6	450 kW	700 A	1 190 A
VKS8000-500-T6	500 kW	800 A	1 360 A

Typical Applications

Large pumps and compressors, industrial fans and blowers, conveyors with high inertia loads, crushers and mills, mixers and agitators, water and wastewater treatment, HVAC systems. The VKS8000 is the cost-effective choice when variable speed control is not required.

Technical Support and Contact Information

For technical support, product selection assistance, spare parts ordering, or warranty enquiries, please contact Electromote through the following channels:

Company	Electrodrive (a division of Electromote)
Website	www.electromote.co.za
Technical Support	+27 10 634 1480
E-mail	support@electromote.co.za

Specifications in this catalogue are subject to change without notice.
All technical data is based on standard operating conditions.
Consult product-specific datasheets for detailed specifications.

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