



FAN CONTROL PANEL **FCP** SERIES



Energy
Optimization



Remote Control
Integration



Robust Safety
Features

WHY KRUGER?

KRUGER has been a leading innovator and manufacturer of residential, commercial and industrial fan application solutions across Asia since 1985. Today with a direct presence in over 18 regions throughout Asia; world class R&D and manufacturing facilities; **KRUGER** are able to offer their customers unparalleled service and support at a local level. Our customers place their trust in **KRUGER**.

Why use a KRUGER Fan Control Panel Solutions

KRUGER's fan control panels are designed to seamlessly integrate with ventilation systems, providing superior performance, energy efficiency, and long-term reliability. Whether for HVAC, industrial ventilation, or mission-critical applications, our solutions ensure precise control, enhanced safety, and operational flexibility.

Why Benefits of KRUGER Fan Control Panels



Energy Optimization: Equipped with advanced smart algorithms, our control panels dynamically adjust motor speed based on demand. This reduces unnecessary energy consumption, lowers operational costs, and contributes to sustainable energy management.



Remote Control Integration: KRUGER panels are fully compatible with PLC and SCADA systems, enabling seamless integration into modern automation networks. This allows centralized control, remote monitoring, and data-driven decision-making for improved system efficiency.



Robust Safety Features: Built with industry-leading safety mechanisms, our panels include overload protection, short-circuit prevention, and emergency stop functions to safeguard both equipment and personnel.





How to Choose the Right Control Panel?



Selecting the appropriate control panel depends on motor size, application requirements, and desired control features. Below is a guide to help you choose the right panel type:

1. DOL Control Panel (0.37-4.0kW)

- ★ **Best for:** Small motors with low starting current
 - Direct full-voltage startup ensures simple and cost-effective operation.
 - Suitable for applications where inrush current is not a concern.
 - Ideal for fans, pumps, conveyors, and simple motor-driven equipment.
- ✓ **Use DOL if:** Your motor $\leq 4\text{kW}$ and does not require reduced starting current.



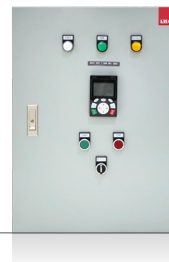
2. Star-Delta Control Panel (4.0-110kW)

- ★ **Best for:** Medium to large motors requiring reduced starting current
 - Reduces inrush current by starting in a lower voltage (Star) before switching to full voltage (Delta).
 - Protects motor windings from electrical stress, extending lifespan.
 - Suitable for HVAC systems, compressors, pumps, and industrial machinery.
- ✓ **Use Star-Delta if:** Your motor $> 4\text{kW}$ or above and experiences high starting currents.



3. VFD Control Panel (2.2-110kW)

- ★ **Best for:** Applications requiring precise speed and energy efficiency
 - Allows motor speed adjustment to match system demand, saving energy.
 - Soft starting and stopping reduce mechanical stress and wear.
 - Compatible with automation systems (PLC, SCADA) for remote control.
- ✓ **Use VFD if:** You need variable speed control, energy savings, or integration with automation.



4. VFD with Bypass Control Panel (2.2-110kW)

- ★ **Best for:** Critical applications requiring backup operation
 - Provides redundancy—if the VFD fails, the bypass allows the motor to run at full speed.
 - Ensures continuous operation in HVAC, critical industrial processes, and emergency ventilation.
 - Balances energy efficiency with operational reliability.
- ✓ **Use VFD with Bypass if:** Your system requires uninterrupted operation, even during VFD maintenance or failure.



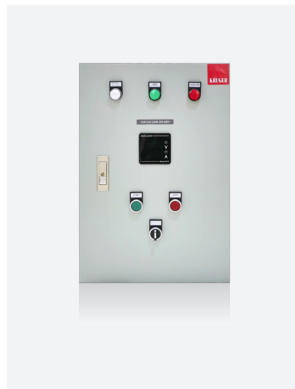
Special types of control panels and additional options, such as temperature sensors, humidity sensors, CO sensors, CO₂ sensors, PLCs, or SCADA controllers, can be provided based on customer requirements.



DOL Control Panel (0.37-4kW)

Operating Principle

A Direct-On-Line (DOL) starter supplies full voltage to the motor from the start, ensuring a simple and efficient startup. It is ideal for small to medium-sized motors that do not require reduced starting current. The system allows instant motor operation while providing overload protection for safety.



Features

- Manual / Auto mode
- Built-In Volt-Amp meter
- Built-In Motor Overload protector
- Built-In Phase protector
- Schneider equipment
- Design Complied to IEC61439-2
- Wall-mounted installation

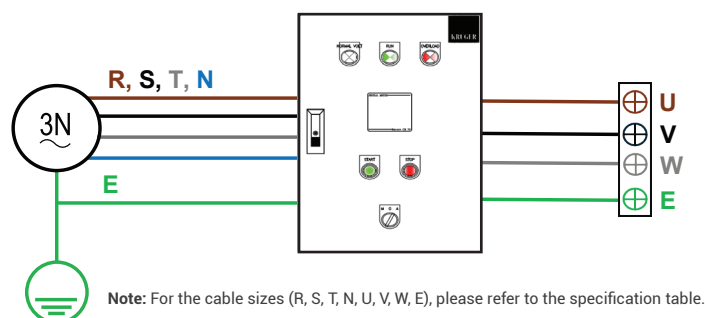
Product Specification

- | | |
|-----------------------|---|
| • Input Power: | 3PH-400V $\pm$ 10% 50/60Hz |
| • Output Voltage: | 3PH 400V $\pm$ 10% 50/60Hz |
| • Power Range: | 0.37 – 4.0kW |
| • Ingress Protection: | IP31 (IP54 / IP55 can be made as per require) |
| • Materials / Color: | Cold Rolled Mild Steel Sheet 0.8 – 1.0mm. / Light Grey (KJ89328Y) |
| • Main Components: | MCB, Main Contactor, Overload Relay |

How to Operate the Panel?

- Power On: Ensure the panel is connected to the power supply correctly.
- Mode Selection: Use the selector switch to choose "Auto or Manual"
 - o Auto: The motor Start/Stop based on an external signal (PLC, Sensor or Timer).
 - o Manual: Press Start to run the motor and Stop to turn it off.
- Power Off: Switch off the panel's Breaker when maintenance is needed.

Installation wiring

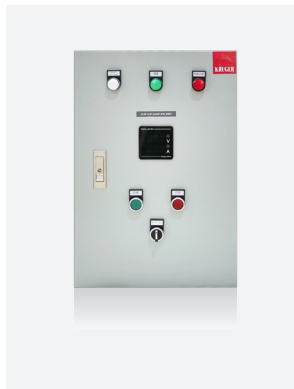




Star-Delta Control Panel (4.0-110kW)

Operating Principle

The Star-Delta starter reduces the starting current of large motors by initially connecting them in a star configuration before switching to a delta connection. This method minimizes electrical stress, prevents voltage drops, and extends motor lifespan.



Features

- Manual / Auto mode
- Reduces inrush current
- Built-In Volt-Amp meter
- Built-In Motor Overload protector
- Built-In Phase protector
- Schneider equipment
- Design Complied to IEC61439-2
- Wall-mounted installation

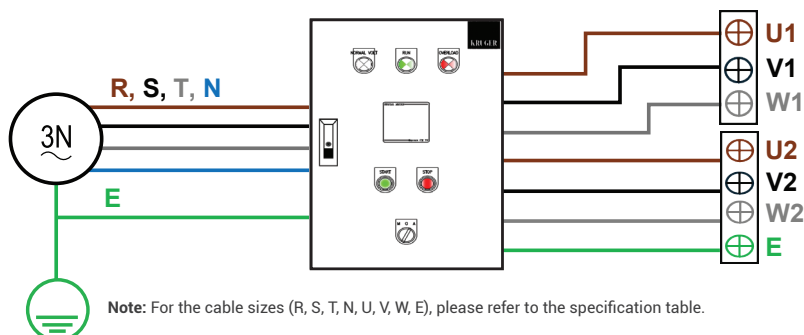
Product Specification

- | | |
|-----------------------|---|
| • Input Power: | 3PH-400V $\pm 10\%$ 50/60Hz |
| • Output Voltage: | 3PH 400V/690V $\pm 10\%$ 50/60Hz |
| • Power Range: | 4.0 – 110kW |
| • Ingress Protection: | IP31 (IP54 / IP55 can be made as per require) |
| • Materials / Color: | Cold Rolled Mild Steel Sheet 0.8 – 1.0mm. / Light Grey (KJ89328Y) |
| • Main Components: | MCB, Main Contactor, Star/Delta Contactor, Timer, Overload Relay |

How to Operate the Panel?

- Power On: Ensure the panel is connected to the power supply correctly.
- Mode Selection: Use the selector switch to choose "Auto or Manual"
 - o Auto: The motor Start/Stop based on an external signal (PLC, Sensor or Timer).
 - o Manual: Press Start to run the motor and Stop to turn it off.
- Power Off: Switch off the panel's Breaker when maintenance is needed.

Installation wiring



Fan Terminal Box

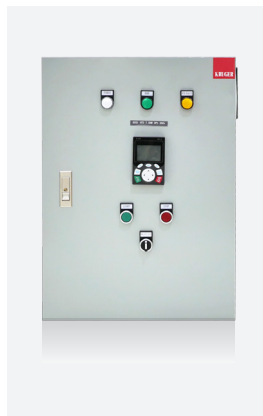




VFD Control Panel (2.2-110kW)

Operating Principle

A Variable Frequency Drive (VFD) panel controls motor speed by adjusting the power frequency. This improves energy efficiency, reduces mechanical stress, and allows smooth acceleration and deceleration.



Features

- Energy Savings – Optimizes motor speed to match demand
- Soft Start/Stop – Reduces mechanical wear and extends equipment life
- Precise Speed Control – Enhances performance in variable load applications
- Built-in Protections – Overload, short circuit, and phase loss protection
- Design Complied to IEC61439-2

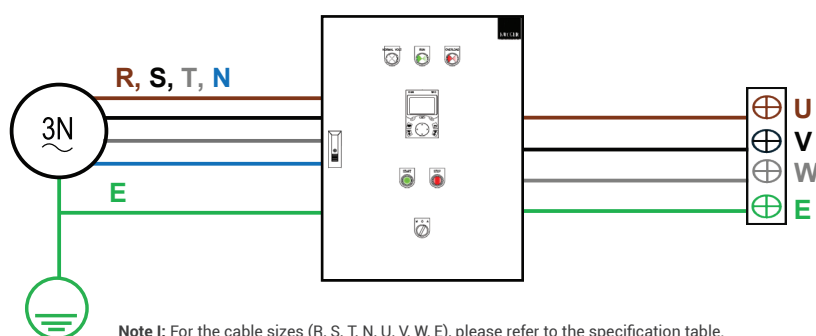
Product Specification

- Input Power: 3PH-400V $\pm 10\%$ 50/60Hz
- Output Voltage: 3PH 400V $\pm 10\%$ 50/60Hz
- Power Range: 2.2 – 110kW
- Communication: Modbus RTU, BACnet MSTP (Optional)
- Ingress Protection: IP31 (IP54 / IP55 can be made as per require)
- Materials / Color: Cold Rolled Mild Steel Sheet 0.8 – 1.0mm. / Light Grey (KJ89328Y)
- Main Components: MCB, Variable Frequency Drive

How to Operate the Panel?

- Power On: Ensure the panel is connected to the power supply correctly.
- Mode Selection: Use the selector switch to choose "Auto or Manual"
 - o Auto: The motor Start/Stop based on an external signal (PLC, Sensor or Timer).
 - o Manual: Press Start to run the motor and Stop to turn it off.
- Speed control: Set Via VFD's KEYPAD
- Power Off: Switch off the panel's Breaker when maintenance is needed.

Installation wiring



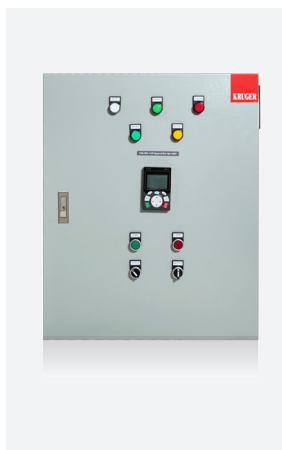
Note I: For the cable sizes (R, S, T, N, U, V, W, E), please refer to the specification table.
Note II: Keep an installation that requires approximately 100 mm of clearance on both the left and right sides for ventilation.



VFD with Bypass Control Panel (2.2-110kW)

Operating Principle

A VFD with Bypass Panel allows motor operation in both VFD mode (for variable speed control) and Bypass mode (for direct-on-line operation). This ensures system reliability in case of VFD failure or maintenance.



Features

- Energy Savings – Optimizes motor speed to match demand
- Dual Operation Modes – VFD mode for energy efficiency, bypass mode for emergency
- Uninterrupted Operation – Ensures system uptime during maintenance or failure
- Soft Start/Stop – Reduces mechanical stress and extends motor life
- Advanced Protection – Overload, short circuit, and phase loss protection
- Design Complied to IEC61439-2

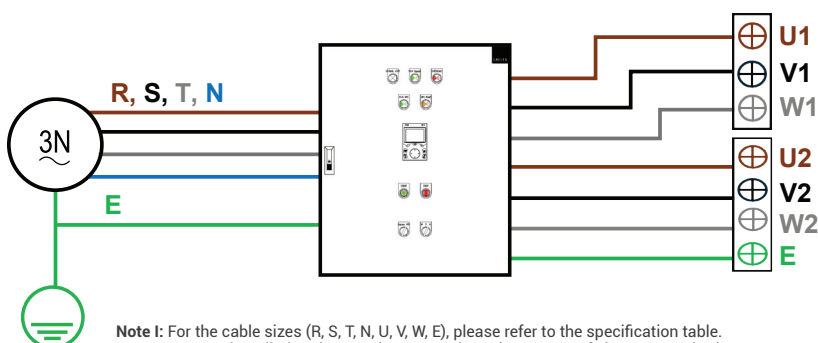
Product Specification

- Input Power: 3PH-400V $\pm 10\%$ 50/60Hz
- Output Voltage: 3PH 400V/690V $\pm 10\%$ 50/60Hz
- Power Range: 2.2 – 110kW
- Communication: Modbus RTU, BACnet MSTP (Optional)
- Ingress Protection: IP31 (IP54 / IP55 can be made as per require)
- Materials / Color: Cold Rolled Mild Steel Sheet 0.8 – 1.0mm. / Light Grey (KJ89328Y)
- Main Components: MCB, VFD, Bypass Contactor, VFD/Bypass selector

How to Operate the Panel?

- Power On: Ensure the panel is connected to the power supply correctly.
- Type Selection: Use the selector switch to choose "VFD or Bypass"
- Mode Selection: Use the selector switch to choose "Auto or Manual"
 - o Auto: The motor Start/Stop based on an external signal (PLC, Sensor or Timer).
 - o Manual: Press Start to run the motor and Stop to turn it off.
- Speed control: Set Via VFD's KEYPAD
- Power Off: Switch off the panel's Breaker when maintenance is needed.

Installation wiring



Note I: For the cable sizes (R, S, T, N, U, V, W, E), please refer to the specification table.
Note II: Keep an installation that requires approximately 100 mm of clearance on both the left and right sides for ventilation.

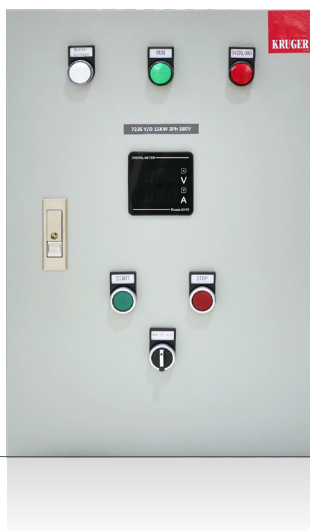




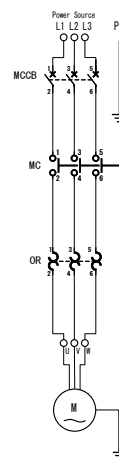
Model list and Specification



DOL Control Panel



Single Line Diagram - Power Circuit



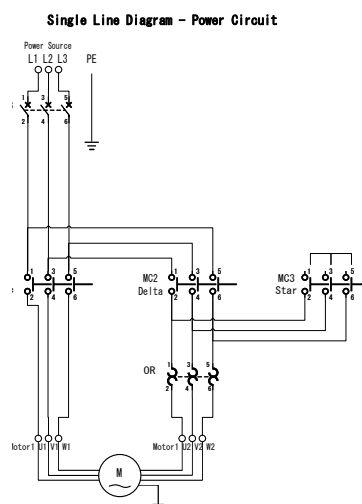
Outlook	Model Name	Output Power (kW)	Full Load (A)	Main Component (Schneider)			VFD Model	Cable size (mm ²)		Panel Size (W x H x D) mm.	Net Weight (kg)
				Circuit Breaker	Magnetic Contactor	Overload Relay		Power Output	To Motor		
DOL	FCP DOL 0.37kW IP31 IN 3PH380V 50/60Hz	0.37	0.8	iK60N 3P C6 (6.0A)	LC1N06M5N (6.0A)	LRN06N 1.0-1.6A	-	1.0	1.0	300 x 450 x 170	5.0
	FCP DOL 0.75kW IP31 IN 3PH380V 50/60Hz	0.75	1.0			LRN07N 1.6-2.5A	-	1.0	1.0	300 x 450 x 170	5.0
	FCP DOL 1.1kW IP31 IN 3PH380V 50/60Hz	1.10	2.0			LRN08N 2.5-4.0A	-	1.0	1.0	300 x 450 x 170	5.0
	FCP DOL 1.5kW IP31 IN 3PH380V 50/60Hz	1.50	2.0				-	1.0	1.0	300 x 450 x 170	5.0
	FCP DOL 2.2kW IP31 IN 3PH380V 50/60Hz	2.20	3.0	iK60N 3P C10 (10.0A)	LC1N09M5N (9.0A)	LRN10N 4.0-6.0A	-	1.5	1.5	300 x 450 x 170	5.5
	FCP DOL 3.0kW IP31 IN 3PH380V 50/60Hz	3.00	4.0			LRN12N 5.5-8.0A	-	1.5	1.5	300 x 450 x 170	9.0
	FCP DOL 4.0kW IP31 IN 3PH380V 50/60Hz	4.00	5.5	iK60N 3P C16 (16.0A)	LC1N18M5N (18.0A)	LRN16N 9-13A	-	1.5	1.5	300 x 450 x 170	13.0



Model list and Specification



Star-Delta Control Panel

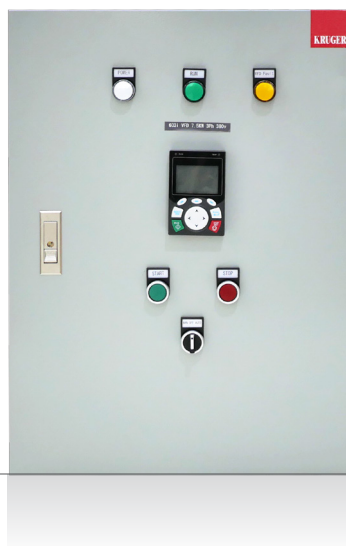


Outlook	Model Name	Output Power (kW)	Full Load (A)	Main Component (Schneider)			VFD Model	Cable size (mm ²)		Panel Size (W x H x D) mm.	Net Weight (kg)
				Circuit Breaker	Magnetic Contactor	Overload Relay		Power Output	To Motor		
Star-Delta	FCP YD 4kW IP31 IN 3PH380V 50/60Hz	4.00	5.0	GoPact G12E3A16 (16.0A)	LC1N12M5N (12A)	LRN16N 9-13A	-	1.5	1.5	400 x 570 x 200	20.0
	FCP YD 5.5kW IP31 IN 3PH380V 50/60Hz	5.50	7.5	GoPact G12E3A16 (16.0A)	LC1N12M5N (12A)	LRN16N 9-13A	-	1.5	1.5	400 x 570 x 200	25.0
	FCP YD 7.5kW IP31 IN 3PH380V 50/60Hz	7.50	16.0	GoPact G12E3A16 (16.0A)	LC1N12M5N (12A)	LRN16N 9-13A	-	2.5	2.5	400 x 570 x 200	30.0
	FCP YD 11kW IP31 IN 3PH380V 50/60Hz	11.0	23.0	GoPact G12E3A32 (32.0A)	LC1N18M5N (18A)	LRN21N 12-18A	-	4	4	400 x 570 x 200	35.0
	FCP YD 15kW IP31 IN 3PH380V 50/60Hz	15.0	31.0	GoPact G12E3A40 (40.0A)	LC1N25M5N (25A)	LRN22N 16-24A	-	6	6	400 x 570 x 200	45.0
	FCP YD 18kW IP31 IN 3PH380V 50/60Hz	18.5	37.0	GoPact G12E3A50 (50.0A)	LC1N32M5N (32A)	LRN32N 23-32A	-	10	10	400 x 570 x 200	45.0
	FCP YD 22kW IP31 IN 3PH380V 50/60Hz	22.0	43.0	GoPact G12E3A63 (63.0A)			-	10	10	400 x 570 x 200	50.0
	FCP YD 30kW IP31 IN 3PH380V 50/60Hz	30.0	58.0	GoPact G12E3A80 (80.0A)	LC1N50M5N (50A)	LRN355N 30-40A	-	16	16	440 x 610 x 230	55.0
	FCP YD 37kW IP31 IN 3PH380V 50/60Hz	37.0	69.0			LRN357N 37-50A	-	25	25	440 x 610 x 230	60.0
	FCP YD 45kW IP31 IN 3PH380V 50/60Hz	45.0	84.0	GoPact G12E3A100 (100A)	LC1N65M5N (65A)	LRN359N 48-65A	-	25	25	440 x 610 x 230	70.0
	FCP YD 55kW IP31 IN 3PH380V 50/60Hz	55.0	102.0	GoPact G12E3A125 (125A)	LC1N80M5N (80A)	LRN361N 55-70A	-	35	35	570 x 690 x 250	80.0
	FCP YD 75kW IP31 IN 3PH380V 50/60Hz	75.0	139.0	GoPact G12E3A160 (160A)	LC1N95M5N (95A)	LRN365N 80-104A	-	50	50	570 x 690 x 250	100.0
	FCP YD 90kW IP31 IN 3PH380V 50/60Hz	90.0	168.0	GoPact G12E3A200 (200A)	LC1E120 (120A)	OR CT200/5 160-240A	-	70	70	600 x 760 x 250	110.0
	FCP YD 110kW IP31 IN 3PH380V 50/60Hz	110.0	205.0	GoPact G12E3A250 (250A)	LC1E160 (160A)	OR CT250/5 200-300A	-	95	95	600 x 760 x 250	130.0

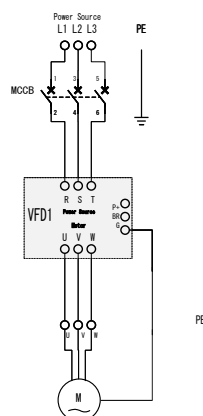
Model list and Specification



VFD Control Panel



Single Line Diagram - Power Circuit



Outlook	Model Name	Output Power (kW)	Full Load (A)	Main Component (Schneider)			VFD Model	Cable size (mm ²)		Panel Size (W x H x D) mm.	Net Weight (kg)
				Circuit Breaker	Magnetic Contactor	Overload Relay		Power Output	To Motor		
VFD panel	FCP VFDP 2.2kW IP31 IN 3PH380V 50/60Hz	2.20	5.0	iK60N 3P C10 (10.0A)	-	-	K320-2R2P-4	1.5	1.5	400 x 570 x 200	20.00
	FCP VFDP 3kW IP31 IN 3PH380V 50/60Hz	3.00	7.0	iK60N 3P C16 (16.0A)	-	-	K320-003P-4	1.5	1.5	400 x 570 x 200	20.00
	FCP VFDP 5.5kW IP31 IN 3PH380V 50/60Hz	5.50	12.5	iK60N 3P C20 (20.0A)	-	-	K320-5R5P-4	1.5	1.5	440 x 610 x 230	25.00
	FCP VFDP 7.5kW IP31 IN 3PH380V 50/60Hz	7.50	17.0	iK60N 3P C32 (32.0A)	-	-	K320-7R5P-4	2.5	2.5	440 x 610 x 230	25.00
	FCP VFDP 11kW IP31 IN 3PH380V 50/60Hz	11.0	23.0		-	-	K320-011P-4	4	4	440 x 610 x 230	35.00
	FCP VFDP 15kW IP31 IN 3PH380V 50/60Hz	15.0	32.0	iK60N 3P C40 (40.0A)	-	-	K320-015P-4	6	6	570 x 690 x 250	40.00
	FCP VFDP 18kW IP31 IN 3PH380V 50/60Hz	18.5	38.0	GoPact G12E3A63 (63.0A)	-	-	K320-018P-4	10	10	570 x 690 x 250	40.00
	FCP VFDP 22kW IP31 IN 3PH380V 50/60Hz	22.0	45.0		-	-	K320-022P-4	10	10	570 x 690 x 250	50.00
	FCP VFDP 30kW IP31 IN 3PH380V 50/60Hz	30.0	60.0	GoPact G12E3A80 (80.0A)	-	-	K320-030P-4	16	16	570 x 690 x 250	50.00
	FCP VFDP 37kW IP31 IN 3PH380V 50/60Hz	37.0	75.0	GoPact G12E3A100 (100A)	-	-	K320-037P-4	25	25	600 x 760 x 250	75.00
	FCP VFDP 45kW IP31 IN 3PH380V 50/60Hz	45.0	92.0		-	-	K320-045P-4	25	25	600 x 760 x 250	75.00
	FCP VFDP 55kW IP31 IN 3PH380V 50/60Hz	55.0	115.0	GoPact G12E3A160 (160A)	-	-	K320-055P-4	35	35	600 x 1100 x 300	80.00
	FCP VFDP 75kW IP31 IN 3PH380V 50/60Hz	75.0	150.0		-	-	K320-075P-4	50	50	600 x 1100 x 300	90.00
	FCP VFDP 90kW IP31 IN 3PH380V 50/60Hz	90.0	170.0	GoPact G12E3A200 (200A)	-	-	K320-090P-4	70	70	600 x 1100 x 300	100.00
	FCP VFDP 110kW IP31 IN 3PH380V 50/60Hz	110.0	215.0	GoPact G12E3A250 (250A)	-	-	K320-110P-4	95	95	800 x 1800 x 800	210.00

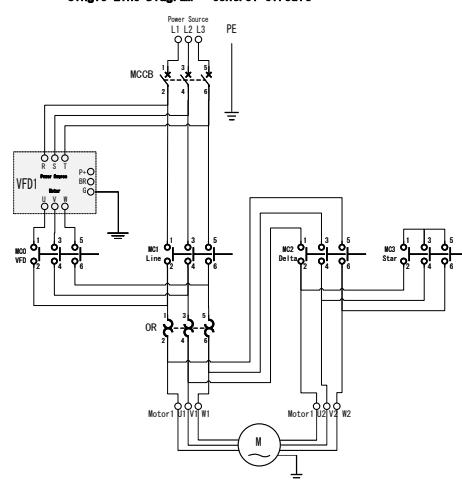
Model list and Specification



VFD with Bypass Control Panel



Single Line Diagram - Control Circuit



Outlook	Model Name	Output Power (kW)	Full Load (A)	Main Component (Schneider)			VFD Model	Cable size (mm ²)		Panel Size (W x H x D) mm.	Net Weight (kg)
				Circuit Breaker	Magnetic Contactor	Overload Relay		Power Output	To Motor		
VFD with Bypass panel	FCP VFDB 2.2kW IP31 IN 3PH380V 50/60Hz	2.20	5.0	iK60N 3P C10 (10.0A)	LC1N06M5N (6.0A)	LRN10N 4.0-6.0A	K320-2R2P-4	1.5	1.5	400 x 570 x 200	25.00
	FCP VFDB 3kW IP31 IN 3PH380V 50/60Hz	3.00	7.0	iK60N 3P C16 (16.0A)	LC1N09M5N (9.0A)	LRN12N 5.5-8.0A	K320-003P-4	1.5	1.5	400 x 570 x 200	30.00
	FCP VFDB 5.5kW IP31 IN 3PH380V 50/60Hz	5.50	12.5	iK60N 3P C20 (20.0A)	LC1N12M5N (12.0A)	LRN16N 9-13A	K320-5R5P-4	1.5	1.5	400 x 570 x 200	30.00
	FCP VFDB 7.5kW IP31 IN 3PH380V 50/60Hz	7.50	17.0	GoPact G12E3A32 (32.0A)	LC1N25M5N (25.0A)	LRN22N 16-24A	K320-7R5P-4	2.5	2.5	440 x 610 x 230	35.00
	FCP VFDB 11kW IP31 IN 3PH380V 50/60Hz	11.0	23.0		LC1N32M5N (32.0A)	LRN32N 23-32A	K320-011P-4	4	4	570 x 690 x 250	45.00
	FCP VFDB 15kW IP31 IN 3PH380V 50/60Hz	15.0	32.0	GoPact G12E3A40 (40.0A)	LC1N40Q5N (40.0A)	LRN35N 30-38A	K320-015P-4	6	6	570 x 690 x 250	50.00
	FCP VFDB 18kW IP31 IN 3PH380V 50/60Hz	18.5	38.0	GoPact G12E3A63 (63.0A)	LC1N50M5N (50.0A)	LRN357N 37-50A	K320-018P-4	10	10	570 x 690 x 250	50.00
	FCP VFDB 22kW IP31 IN 3PH380V 50/60Hz	22.0	45.0		LC1E65M5N (65.0A)	LRN357N 37-50A	K320-022P-4	10	10	570 x 690 x 250	70.00
	FCP VFDB 30kW IP31 IN 3PH380V 50/60Hz	30.0	60.0	GoPact G12E3A80 (80.0A)	LC1E80M5N (80.0A)	LRN361N 55-70A	K320-030P-4	16	16	600 x 760 x 250	75.00
	FCP VFDB 37kW IP31 IN 3PH380V 50/60Hz	37.0	75.0	GoPact G12E3A100 (100A)	LC1E95M5N (95.0A)	LRN363N 63-80A	K320-037P-4	25	25	700 x 1100 x 250	85.00
	FCP VFDB 45kW IP31 IN 3PH380V 50/60Hz	45.0	92.0		LC1E120 (120A)	LRN365N 80-104A	K320-045P-4	25	25	700 x 1100 x 250	90.00
	FCP VFDB 55kW IP31 IN 3PH380V 50/60Hz	55.0	115.0	GoPact G12E3A160 (160A)	LC1E160 (160A)	OR CT200/5 160-240A	K320-055P-4	35	35	800 x 1200 x 300	100.00
	FCP VFDB 75kW IP31 IN 3PH380V 50/60Hz	75.0	150.0		LC1E200 (200A)	OR CT200/5 160-240A	K320-075P-4	50	50	800 x 1200 x 300	130.00
	FCP VFDB 90kW IP31 IN 3PH380V 50/60Hz	90.0	170.0	GoPact G12E3A200 (200A)	LC1E250 (250A)	OR CT200/5 160-240A	K320-090P-4	70	70	900 x 1200 x 300	150.00
	FCP VFDB 110kW IP31 IN 3PH380V 50/60Hz	110.0	215.0	GoPact G12E3A250 (250A)	LC1E300 (300A)	OR CT250/5 200-300A	K320-110P-4	95	95	800 x 1800 x 800	250.00



Maintenance Guide for Control Panel



Regular maintenance minimizes downtime, enhances efficiency, and extends equipment life. It also ensures the reliability and longevity of control panels. Below are the recommended maintenance procedures for each type of panel:

1. Direct-On-Line (DOL) Panel Maintenance

- ✓ Visual Inspection – Check for loose connections, damaged wires, and dust accumulation.
- ✓ Contactors & Relays – Inspect for wear, pitting, and overheating signs.
- ✓ Overload Protection – Test overload relays and adjust settings if necessary.
- ✓ Cleaning – Remove dust and debris to prevent overheating.

Frequency: Every 6 months

2. Star-Delta Panel Maintenance

- ✓ Phase & Timing Check – Verify correct operation of star-to-delta transition.
- ✓ Contactor & Timer Inspection – Ensure timers switch accurately and contactors engage properly.
- ✓ Thermal Protection – Test overload relay functionality to prevent motor damage.
- ✓ Terminal Tightening – Secure all electrical connections to avoid loose wiring issues.

Frequency: Every 6 months

3. VFD Control Panel Maintenance

- ✓ Cooling System Check – Clean cooling fans and heat sinks to prevent overheating.
- ✓ Capacitor Health Check – Inspect VFD capacitors for swelling or leakage.
- ✓ Parameter Verification – Ensure programmed settings match operational requirements.
- ✓ Harmonic & Grounding Inspection – Check grounding and mitigate harmonic interference.

Frequency: Every 3-6 months

4. VFD with Bypass Panel Maintenance

- ✓ Bypass Circuit Test – Verify that the bypass function operates correctly.
- ✓ VFD & Contactor Inspection – Ensure smooth switching between VFD and bypass mode.
- ✓ Power Supply & Protection Devices – Test fuses, breakers, and surge protectors.
- ✓ Environmental Monitoring – Ensure proper ventilation and check for excessive heat buildup.

Frequency: Every 3-6 months

General Maintenance Tips

- ✓ Always follow safety procedures before servicing.
- ✓ Use thermal imaging to detect overheating components.
- ✓ Keep maintenance records to track performance and prevent failures.
- ✓ Ensure firmware updates for VFDs and PLCs when applicable.