DETROITAIR

COMPRESSED AIR INNOVATION THROUGH TECHNOLOGY

SCREW COMPRESSOR

CONTROLLER OPERATING MANUAL

AIR SCREW CONTROLLER AND PROTECTION SYSTEMS FOR DLS 220Volt
VARIABLE SPEED SCREW COMPRESSOR SERIES DLS-5V ~ DLS-10V

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1. Special Integrated Controller for Air Compressor

Product Technical Features

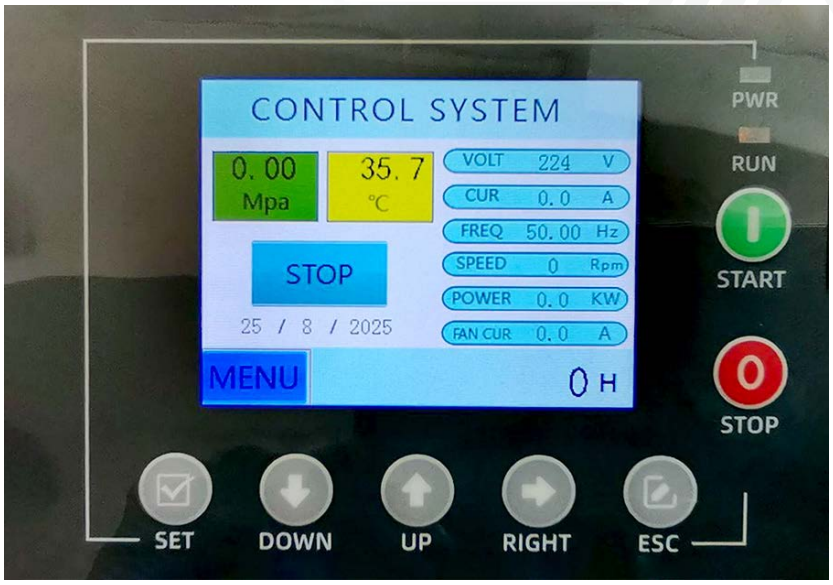
- Integrated display and drive solution, reducing the need for a separate PLC and other low voltage components.
- No external auxiliary equipment required, resulting in simplified wiring, easier operation, enhanced protection, and fewer failure points.
- Visual control interface — all frequency converter parameters and system control settings can be configured directly through the display. Includes built in maintenance reminders.
- Intelligent sleep and wake up control, improving system safety, energy efficiency, and automation.
- High performance pressure PID control, ensuring stable and accurate air supply pressure.
- Integrated temperature warning and alarm functions, with temperature control logic designed specifically for air compressor applications.
- Built in PT100 temperature interface and pressure signal interface.
- Multi level password protection on both the display and the driver to prevent unauthorized operation.

2. Button Instructions

Basic Operation of Control Panel

FIGURE 1-1: Main Interface

Note: *The parameters displayed on this interface are real time system readings. They indicate the current operating status of the air compressor and cannot be modified.*



START BUTTON
- Starts the air compressor when in standby mode

SHUTDOWN / RESET BUTTON
- Stops the air compressor during operation
- Resets the system after a fault shutdown

ENTER / CONFIRM BUTTON
- Enters the main menu during operation
- Confirms and saves data in setting mode

DOWN KEY
- Scrolls downward when viewing parameters
- Decreases the value at the flashing cursor when modifying data

UP KEY
- Scrolls upward when viewing parameters
- Increases the value at the flashing cursor when modifying data

SHIFT KEY
- Moves the cursor to the next digit when modifying data

BACK KEY
- Exits setting mode
- Returns to the previous menu when viewing parameters

3. Indicator Light Instructions

POWER INDICATOR

- Illuminates when the controller is powered on

OPERATION INDICATOR

- Flashes during compressor operation to indicate normal communication

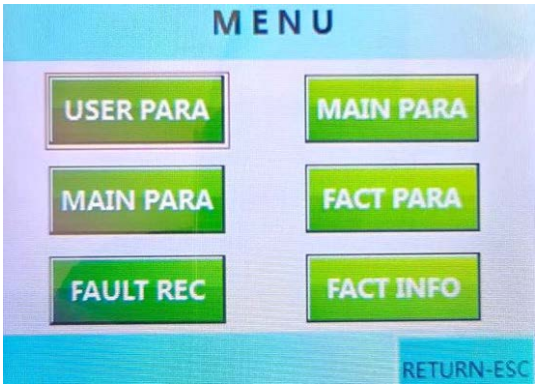
4. Status Display and Operation

After power on, the interface shown in **Figure 1-1** appears. From this interface, the operator can:

- Start or stop the air compressor
- Reset the frequency converter after a fault
- Monitor real time operating status

If a fault occurs, the fault type is displayed above the dynamic screen, allowing timely troubleshooting.

FIGURE 1-2: Menu

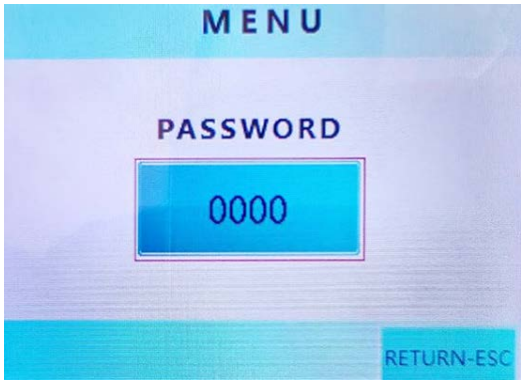


To enter the Main Menu:

- Press **ENTER** – opens **Figure 1-2: MENU**
- Press **ENTER** again to access Parameter Menus
- Use **SHIFT** to navigate
- Press **BACK** to return to the Main Interface

Note: *Viewing or modifying parameters requires a user password.*

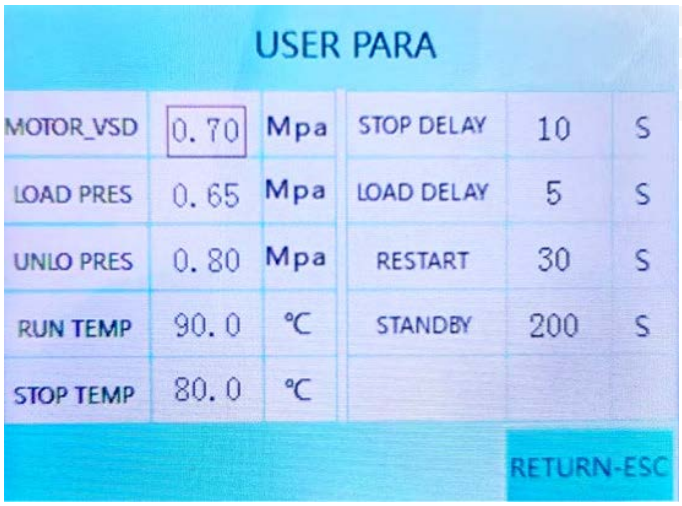
FIGURE 1-3: Password



To enter a Password:

1. Press **ENTER** to open the password screen
2. Press **ENTER** again — the password digits will flash.
3. Use **UP, DOWN** and **SHIFT** to enter the password.
4. Press **ENTER** to confirm.
5. Press **BACK** to exit after adjustments.

FIGURE 1-4: USER PARA



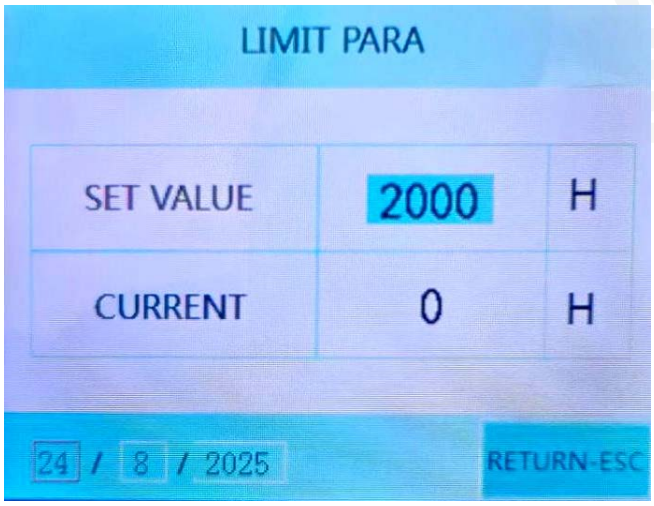
User Parameter Table — Part 1:

Parameter Item	Initial Value	Function / Description
MOTOR VSD	0.70 MPa	Target pressure for constant pressure mode (VSD control).

User Parameter Table — Part 2:

Parameter Item	Initial Value	Function / Description
LOAD PRES	0.60 MPa	Auto load when pressure falls below this value. Auto start in standby if conditions are met.
UNLI PRES	0.80 MPa	Auto unload when pressure exceeds this value. Must be ≤ unload high limit.
RUN TEMP	90°C	Fan turns on when exhaust temperature exceeds this value.
STOP TEMP	80°C	Fan turns off when exhaust temperature falls below this value.
LOAD DELAY	5 s	Delay before loading after startup (power frequency control).
STANDBY	200 s	Maximum no load running time before automatic shutdown.
STOP DELAY	10 s	No load running time after shutdown command before stopping.
RESTART	30 s	Delay before restart after shutdown or fault.

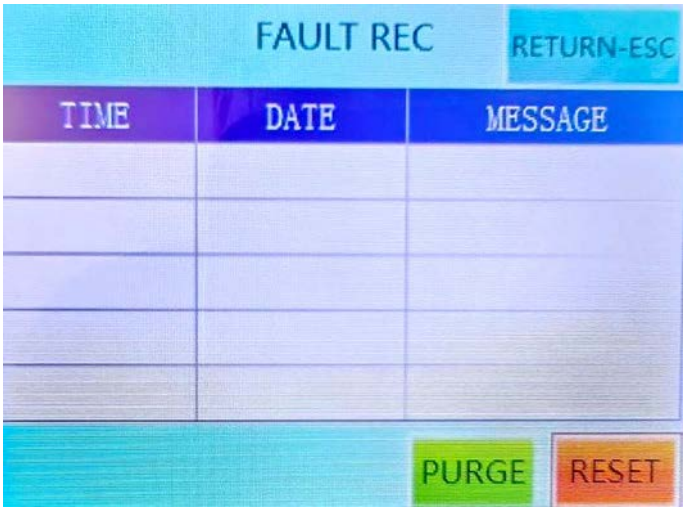
FIGURE 1-5: LIMIT PARA



Maintenance Limit Parameters:

Parameter Item	Initial Value	Function / Description
SET VALUE	2000 h	Maintenance interval. Warning issued when exceeded. "0000" disables warnings.
CURRENT	0 h	Accumulated lubricating oil usage time. Reset after oil replacement.

FIGURE 1-6: FAULT REC



The controller records current and historical faults, including fault type and occurrence time.

FIGURE 1-7: Motor Parameters (MAIN PARA)

Motor Parameter Table — Part 1

Parameter Item	Initial Value	Function / Description
POWER	kW	Factory set motor power rating (non editable).
MAX FREQ	Hz	Maximum loading frequency.
MIN FREQ	Hz	Minimum frequency when pressure exceeds working pressure but is below unloading pressure.
UNLD FREQ	Hz	Frequency during unloading.
UP SPEED	30 s	Acceleration time to prevent rapid frequency rise.

Motor Parameter Table — Part 2

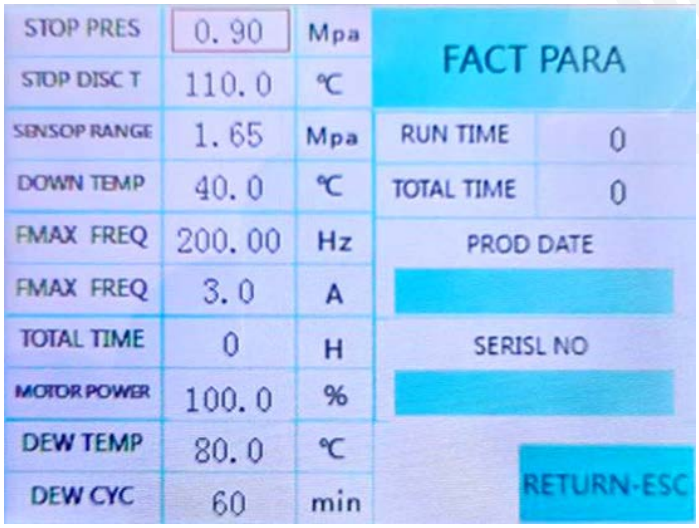
Parameter Item	Initial Value	Function / Description
DN SPEED	30 s	Deceleration time to prevent rapid frequency drop.

FIGURE 1-8: Manual Testing (CRAWL PARA)

To perform manual testing

1. Enter the jog interface.
2. Press **ENTER.**
3. Use **UP**, **DOWN** and **SHIFT** to select the test item.
4. Press **ENTER** to start or stop the function.
5. Press **BACK** to exit.

FIGURE 1-9: Manufacturer Parameters (FACT PARA)



FACT PARA — Table 1

Parameter Item	Initial Value	Function / Description
STOP PRES	0.90 MPa	Over pressure shutdown.
STOP DISC T	110°C	Shutdown due to excessive exhaust temperature.
SENSOR RANGE	1.60 MPa	Set according to pressure sensor range.
DOWN TEMP	40°C	Below 40°C, unit runs at low frequency.

FACT PARA — Table 2

Parameter Item	Initial Value	Function / Description
FMAX FREQ	240 Hz	Maximum loading frequency.
FAN CUR	3.0 A	Fan overcurrent protection threshold.
TOTAL TIME	0 h	Maintenance cycle limit. "0" disables this function.
DEW TEMP	40°C	Below 80°C, unit will not enter no load delay to prevent moisture issues.
DEW CYC	60 min	Dew point cycle time.
TOTAL TIME	00000 h	Editable total load time.
RUN TIME	00000 h	Editable total running time.

FIGURE 1-10: Manufacturer Information (FACT INFO)

Displays manufacturing date and machine serial number.

5. Fault Alarms & Countermeasures

WHEN A FAULT OCCURS:

- Output stops
- Fault relay activates
- Fault code is displayed

Fault Table — Part 1

Display	Cause	Countermeasure
Inverter Unit Protection	Driver board abnormality	Seek technical support
Accelerated Overcurrent	Ground fault, short circuit, short accel/ decel time, low voltage, sudden load	Remove faults, adjust accel/decel time, correct voltage
Deceleration Overcurrent	Same as above	Same as above
Constant Speed Overcurrent	Same as above	Same as above
Accelerated Overvoltage	High input voltage, short accel/decel time, external force on motor	Correct voltage, add braking resistor, increase accel time
Deceleration Overvoltage	Same as above	Same as above
Constant Speed Overvoltage	Same as above	Same as above

Phase Sequence Error	Incorrect or missing phase	Check wiring
Inverter Undervoltage	Power outage, low voltage, driver board fault	Reset, correct voltage, seek support
Inverter Overload	Excessive load or motor stall	Reduce load, inspect motor
Motor Overload	Excessive load or motor stall	Reduce load, inspect motor

Fault Table — Part 2

Display	Cause	Countermeasure
Input Phase Loss	Abnormal 3 phase input, board fault	Check wiring, seek support
Output Phase Loss	Motor wiring fault, unbalanced output, module fault	Fix wiring, inspect motor, seek support
Module Overheating	High ambient temp, blocked airflow, fan failure, module fault	Reduce temperature, clean ducts, replace fan
Temperature Sensor Failure	Poor cooling, low oil, sensor fault	Check ventilation, oil level, sensor wiring
Current Detection Fault	Hall sensor or driver board fault	Replace Hall sensor or board
Pressure Sensor Disconnected	Wiring fault, damaged sensor	Inspect wiring and sensor
Motor Short To Ground	Cable or motor short	Replace cable/motor or board
Pressure Exceeds Limit	Excessive pressure, inaccurate sensor	Check pressure system, inspect sensor

Additional Faults

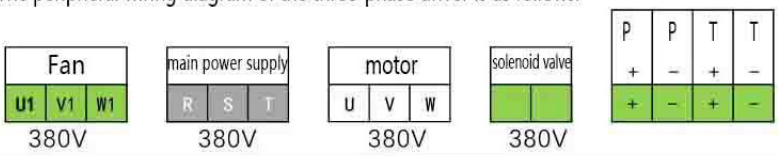
Fault	Cause	Countermeasure
Running Time Exceeded	Maintenance interval reached	Perform maintenance
Fan Overload	Overload, bearing wear, mechanical fault	Check voltage, bearings, pipelines
Emergency Shutdown	Emergency stop switch activated or faulty	Inspect switch
Drop Load	Control board fault	Seek technical support

6. Technical Specifications

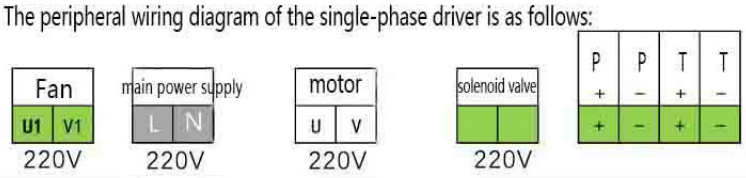
MODEL		DLS-4VSD	DLS-5VSD	DLS-7.5VSD	DLS-10VSD
MOTOR POWER	kW	3	3.7	5.5	7.5
FAD/ DISCHARGE PRESSURE	0.7 MPa				
	0.8 MPa				
	1.0 MPa	0.3	0.47	0.55	0.79
DRIVE TYPE		Direct Drive			
START SYSTEM		Variable Speed			
OIL VOLUME	LTRS	8L			
MOTOR SERVICE FACTOR		SF1.2			
FULL LOAD CURRENT AT 220V		9.7	12.8	17.8	22.8
FAN MOTOR POWER	WATT	180			
AIRFLOW OF COOLING FAN (M^3/HR) PER FAN		2480			
MINIMUM CABLE CROSS SECTION (MM^2) PER CORE		6			
DIMENSIONS (mm)	L	620			
	W	680			
	H	1600			
NET WEIGHT	KG	164	166	168	176
NOISE	dB(A)	68±2			
OUTLET DIAMETER		DN20			
PRESSURE VESSEL		130L			

7. Peripheral Wiring Diagram

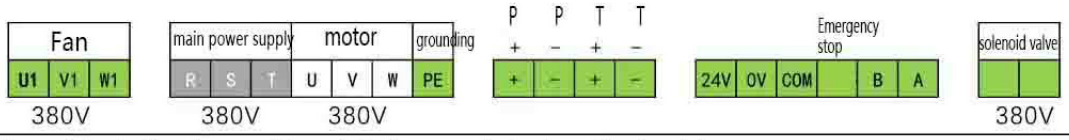
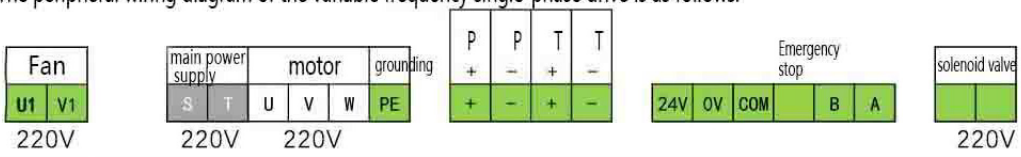
The peripheral wiring diagram of the three-phase driver is as follows:



The peripheral wiring diagram of the single-phase driver is as follows:



The peripheral wiring diagram of the variable frequency three-phase drive is as follows:



The peripheral wiring diagram of the variable frequency single-phase drive is as follows: