

DCS500 Series Drive Quick-start

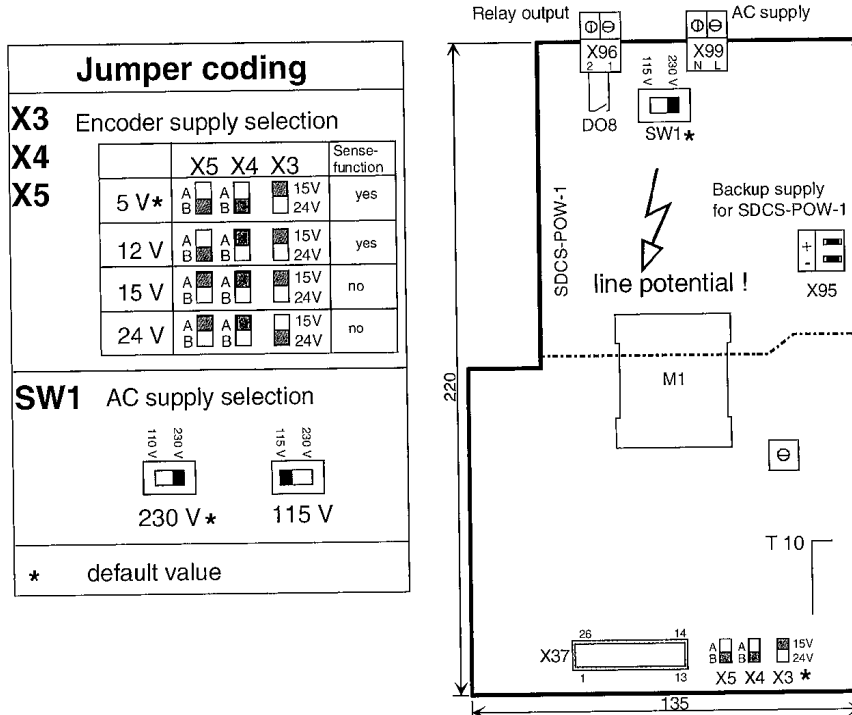
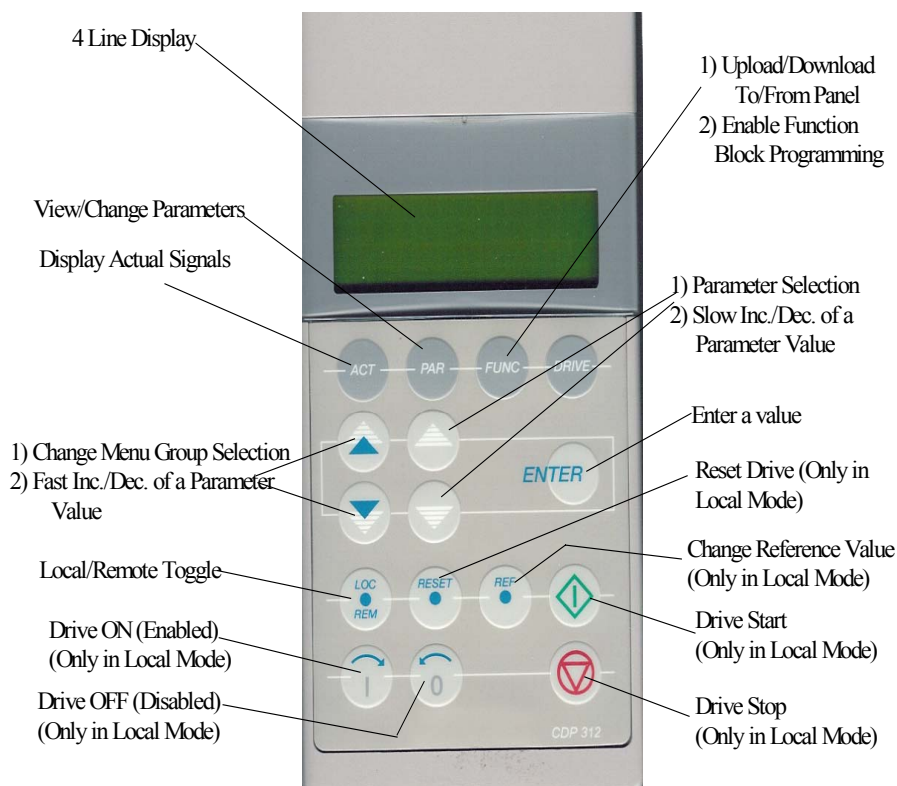


Fig. 4.1/1 Layout of the SDCS-POW-1 board



1) Prepare Drive (Refer to page 1)

- 1) Power OFF. Set switch SW-1 on power supply board for 115 or 230 VAC
- 2) For Encoder Feedback: Set X3, X4 & X5 jumpers on power supply board
- 3) Move S2 jumper on main logic board to pins 1 & 2
- 4)
 - a) Power ON
 - b) Reset Factory Values (P112.02)
 - c) Save MOT1 Set (P112.02)
 - d) Power OFF
- 5) Move S2 jumper on main logic board back to pins 3 & 4 (Normal Position)

2) Initial Set Up (Refer to page 1)

- 1) Power ON. LOCAL mode on CDP312
- 2) Record software version (P112.18)
- 3) Emergency Stop DI5 must be ON (DI5 = ON)
- 4) If a Macro needs to be used select it in P12.14 (1=Standard, 2=Hand/Auto, 3=Process)
- 5) (Only if a Macro **Was** selected): Set P9.15 = CLOSE WHEN ON
- 6) (Only if a Macro was **NOT** selected): Record the default values in P9.10, P9.11, & P9.12. Then, set P9.10 AND P9.11 = 109.08 & Set P9.12 = 109.10
- 7) Set Motor Data:
 - P5.01 = Motor Armature Volts
 - P5.02 = Motor Armature Current
 - P5.03 = Motor Field Amps
 - P5.05 = FEX2 or FEX3
 - P5.07 = Line Voltage
- 8) If drive is >2000 amps, set P5.17 through P5.21
- 9) Save MOT1 Set (P112.02)
- 10) Drive ON (Enabled) using CDP-312. If Phase Sequence Fault occurs, set P5.06 = RTS
- 11) Reset drive if necessary and Save MOT1 Set (P112.02)
- 12) Check/Correct rotation of cooling fan on drives with 3 phase cooling fans (C3 and C4 Chassis sizes)

3) Field Auto Tuning

- 1) Drive ON (Enabled) using CDP-312. Check field current (P113.02) & adjust if necessary (P5.03)
- 2) Set P12.01 = FEX2/3 AUTOTUNING. Field will autotune. OK if P12.01 = NOT ACTIVATED after several minutes.
- 3) Save MOT1 Set (P112.02)
- 4) Power OFF. Unplug X1 connector from bottom of field supply if 16 Amp Unit. If not, remove power from field supply by removing fuses or tripping off breaker.

4) Armature Auto Tuning

- 1) Power ON. LOCAL mode on CDP312. Set P5.05 = NO FIELD EXCITER
- 2) Drive ON (Enabled) using CDP-312.
- 3) Set P12.01 = ARM. AUTOTUNING
- 4) Drive Start using CDP-312. Armature will autotune. OK if P12.01 = NOT ACTIVATED after several minutes. If autotuning fails, check P112.01 for the reason why.
- 5) Set P5.05 = FEX2 OR FEX3
- 6) (Only if a Macro was selected): Set P9.15 = CLOSE WHEN ON + RUN
- 7) Save MOT1 Set (P112.02)
- 8) Power OFF. Re-connect field supply

5) EMF Feedback Mode

- 1) Power ON. LOCAL mode on CDP312.
- 2) Set P21.03 = Base Speed of Motor
- 3) Drive ON (Enabled) and Start using CDP-312
- 4) Reference on CDP-312 = 150 RPM. Check motor speed = 150 RPM.
- 5) Check for proper rotation. If incorrect, power drive down, reverse field leads and repeat steps 1 to 4 in this section.
- 6) If no tach or encoder will be used, commissioning is complete. Go to **Adapt Drive to the Application** section.
- 7) If using analog tach or encoder feedback, proceed with next steps

6) Tach Feedback Mode (For Encoder Feedback, Skip this section)

- 1) Make sure drive is ON (Enabled) and started. Set reference to 150 RPM.
- 2) Measure tach voltage using a DVM with + probe on terminal X3:4 and – probe on X3:1,2 or 3 (Depending on tach connection). Voltage must be **positive**. If not, stop the drive, reverse tach leads, start drive back up and make sure voltage is now positive.
- 3) Turn tach calibration pot R2716 on main control board fully CCW
- 4) Stop then disable drive using CDP-312
- 5) Set P1.01 = TACHO VOLT./±10 (Enables tach analog input)
- 6) Set P21.02 = ANALOG TACHO (Selects tach feedback mode)
- 7) Drive ON (Enabled) and Start using CDP-312
- 8) Set reference on CDP-312 for 150 RPM. Adjust pot R2716 until motor runs 150 RPM
- 9) Increase reference to 1500 RPM. Fine tune pot R2716 until motor runs 1500 RPM.
- 10) Stop then disable drive using CDP-312
- 11) Save MOT1 Set (P112.02)
- 12) If drive field weakening is not needed, go to **Adapt Drive to the Application** section. If it is, go to **Field Weakening** Section.

7) Encoder Feedback Mode

- 1) Make sure drive is ON (Enabled) and started. Set reference to 150 RPM.
- 2) Assuming a quadrature type encoder with four channels (ChA+, ChA-, ChB+, ChB-) check P121.04. It should count upwards if motor is turning in the forward direction. If the value does not change, check encoder wiring. If value counts downward, reverse the two leads for ChA+ and ChA- on terminal X5:1 and X5:2. Now make sure P121.04 is counting upward.
- 3) Stop then disable drive using CDP-312
- 4) Set P21.01 = (encoder PPR). (For a 1024 PPR encoder, P21.01 = 1024)
- 5) Set P21.02 = ENCODER A+,-,B+,-
- 6) Drive ON (Enabled) and Start using CDP-312. Set the reference to 150 RPM. Make sure motor runs at 150 RPM. Change reference to 1500 RPM and check motor runs at 1500 RPM
- 7) Stop then disable drive using CDP-312.
- 8) Save MOT1 Set (P112.02)
- 9) If drive field weakening is not needed, go to **Adapt Drive to the Application** section. If it is, go to **Field Weakening** Section.

8) Field Weakening

- 1) Set P21.03 = (maximum desired motor speed)
 - 2) Set P10.01 = EMF,NO FIELD REV
 - 3) Set P10.06 = 95%
 - 4) Set P10.12 = (motor base speed)
 - 5) Save MOT1 Set (P112.02)
 - 6) Enable and start drive using CDP-312.
 - 7) Set reference for 150 RPM. Check that motor is running in control. Progressively increase reference to the maximum RPM set in P21.03
 - 8) (Only if analog tach feedback is being used): Adjust pot R2716 on main control board until motor runs at the desired maximum speed.
 - 9) (Only if encoder feedback is being used): Check to make sure motor runs at the desired maximum speed. No other adjustments are necessary.
- NOTE: If drive faults on **NO Field ACK**, as the drive approaches maximum speed, decrease the value in P13.05 (Minimum field current threshold)
- 10) Save MOT1 Set (P112.02)

9) Adapt Drive to the Application

- 1) (If no Macro is being used): Configure all digital inputs as necessary. P9.10, P9.11 & P9.12 may need to be set back to their default values if the converter cooling fan, motor cooling fan and/or the main contactor needs to be monitored. (See the software diagrams on pages 3-2 to 3-17 of the System Description manual)
- 2) Set Accel rate in P17.08 & Decel rate in P17.09
- 3) Set: P23.01 = 23.05 P23.02 = 23.06 P23.03 = 23.05 P23.04 = 23.06
- 4) Set P23.05 = Max. Positive Torque Required in %
Set P23.06 = Max. Negative Torque Required in -%
- 5) Set P23.07 = Max. Positive Overload Current Required in Amps
Set P23.08 = Max. Negative Overload Current Required in -Amps
- 6) Save MOT1 Set (P112.02)
- 7) Using CDP-312, set drive for Remote mode.

10) Final Tuning

- 1) Adjust speed controller for maximum motor performance and stability.
P20.14 = Speed Loop Proportional Gain (Default = 500) (Increase for higher drive response)
P20.18 = Speed Loop Integral Time (Default = 5000) (Decrease for higher drive response)
If drive seems too sluggish with the default values, try P20.14 = 1000 to 2000 and P20.18 = 2000 To 2500. Then fine tune both parameters for more or less response as necessary.
- 2) When speed loop tuning is complete, Save MOT1 Set (P112.02)