

## DIGIFLEX® DIGITAL SERVO DRIVES

### MODEL: DQ111SE30A40NAC-H

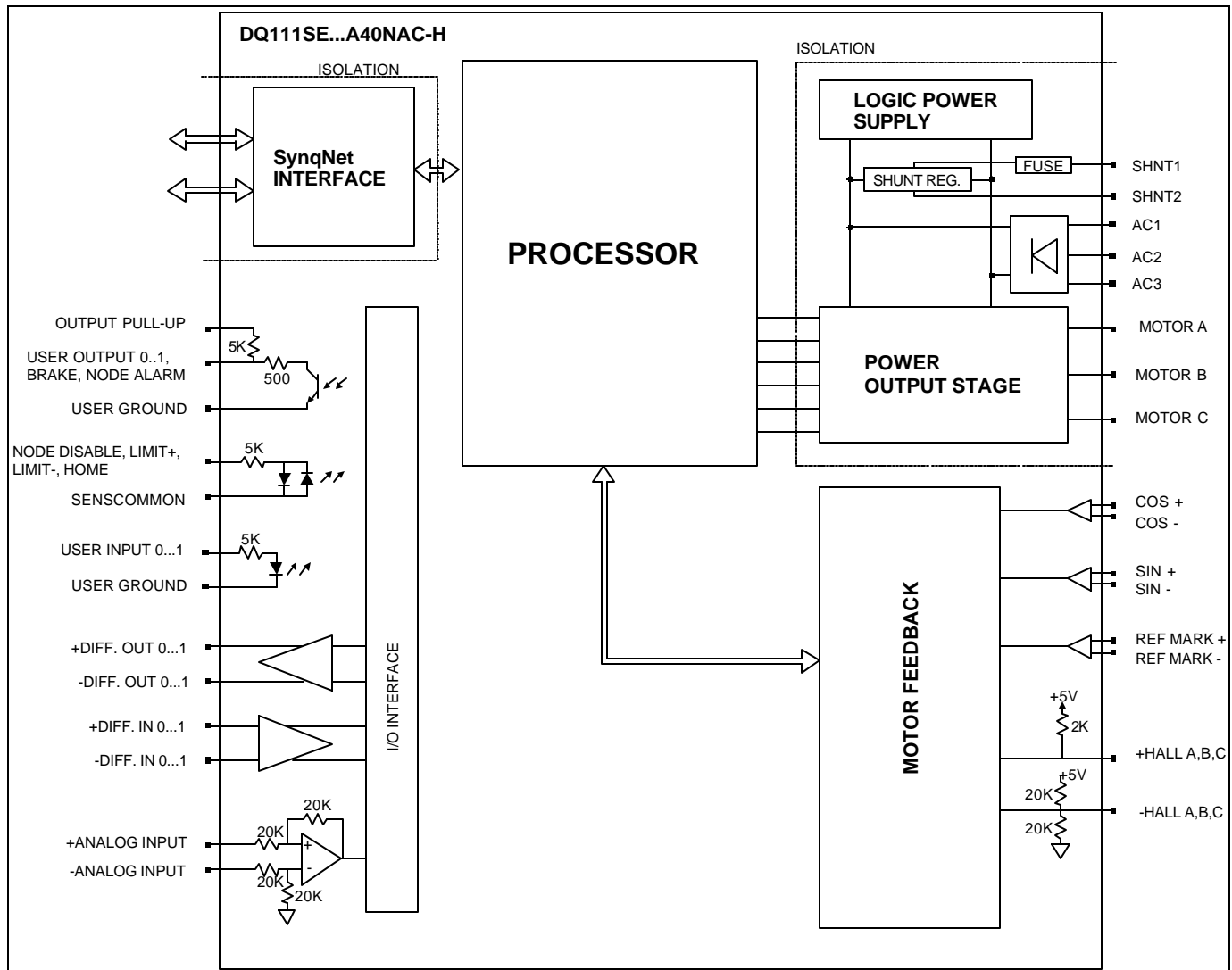
WITH **SynqNet™** INTERFACE

#### FEATURES:

- Fully digital, state-of-the-art design
- Space Vector Modulation and vector control technology
- 20kHz Digital current loop with programmable gain settings
- Sine/cosine encoder (1Vpp) interface
- Up to 11-bit sine/cosine interpolation (x2048) provides high resolution position feedback (contact factory for higher resolution)
- Hall sensor + encoder or encoder only sinusoidal commutation
- Surface-mount technology
- Small size, low cost, ease of use
  
- SynqNet™ motion control network interface
- Windows95/98/2000/ME/NT© based setup software for setup via SynqNet™ interface
- Operates in torque mode with programmable gain settings and current limiting
  
- 2 programmable isolated digital inputs
- 2 programmable isolated digital outputs
- Dedicated Brake and Node Alarm outputs
- 14-bit reference input or programmable analog input
- 2 high-speed differential inputs (high-speed capture, encoder input)
- 2 high-speed differential outputs (step&dir, divide-by-N)
- Dedicated, isolated node disable, positive and negative limits, and home inputs
  
- Off-line 1 or 3-phase 240VAC operation
- Four quadrant regenerative operation
- Integrated shunt regulator
- Bi-color LED status indicator
- Extensive built-in protection against:
  - over-voltage (programmable)
  - under-voltage (programmable)
  - short-circuit: phase-phase, phase-ground
    - over-current
    - over-temperature



**BLOCK DIAGRAM:**



**DESCRIPTION:**

The DQ111SE-H Series digital PWM servo drives are designed to drive brushed and brushless servomotors. These fully digital drives operate in torque mode and employ Space Vector Modulation (SVM), which results in higher bus voltage utilization and reduced heat dissipation. The command source can be generated internally or can be supplied externally. In addition to motor control, these drives feature dedicated and programmable digital and analog inputs and outputs to enhance interfacing with external controllers and devices.

DQ111SE-H Series drives feature a SynqNet™ interface for high-speed digital command operation in networked applications. Drive commissioning can be accomplished through a fully graphical Windows© based application via the SynqNet interface™.

More information about SynqNet™ can be obtained at <http://www.synqnet.org>.

All drive and motor parameters are stored in non-volatile memory.

**SPECIFICATIONS:**

| <b>POWER STAGE SPECIFICATIONS</b>       | <b>DQ111SE30A40NAC-H</b>               |
|---|--|
| AC SUPPLY VOLTAGE                       | 40 – 270 VAC, 1 or 3-phase, 50 – 60 Hz |
| PEAK CURRENT                            | 30A (21.2 Arms)                        |
| MAXIMUM CONTINUOUS CURRENT              | 15A (10.6 Arms)                        |
| MINIMUM LOAD INDUCTANCE                 | 600 $\mu$ H                            |
| SWITCHING FREQUENCY                     | 20 kHz                                 |
| HEATSINK (BASEPLATE) TEMPERATURE RANGE  | 0 to 65 °C, disables at 65 °C          |
| POWER DISSIPATION AT CONTINUOUS CURRENT | 200W                                   |
| MIN. UNDER-VOLTAGE SHUTDOWN             | 55 VDC                                 |
| MAX. OVER-VOLTAGE SHUTDOWN              | 439 VDC                                |
| BUS CAPACITANCE                         | 1410 $\mu$ F                           |
| SHUNT RESISTOR                          | External                               |
| SHUNT SWITCH-ON VOLTAGE                 | Programmable                           |
| SHUNT FUSE                              | 3A Motor Delay @ 250VAC                |

| <b>MECHANICAL SPECIFICATIONS</b> |   |
|----------------------------------|---|
| POWER CONNECTOR: P1              | Screw terminal                                |
| MOTOR FEEDBACK CONNECTOR: CN4*   | 15-pin high density female D-sub              |
| I/O CONNECTOR: CN3*              | 26-pin high density female D-sub              |
| SYNQNET™ CONNECTOR: CN1, CN2*    | 8-pin RJ45                                    |
| SIZE                             | 7.95 x 6.18 x 2.76 inches<br>202x 157 x 70 mm |
| WEIGHT                           |   |

\* Mating connectors are not included.

**PIN FUNCTIONS:**

P1 - Motor and Power Connector:

| CONNECTOR | PIN | NAME  | DESCRIPTION                                       | I/O |
|-----------|-----|-------|---|-----|
| P1        | 1   | MA    | Motor phase A                                     | O   |
|           | 2   | MB    | Motor phase B                                     | O   |
|           | 3   | MC    | Motor phase C                                     | O   |
|           | 4   | SHNT1 | External shunt resistor connection                | O   |
|           | 5   | SHNT2 |   | O   |
|           | 6   | AC1   | AC supply input. 40 – 270 VAC, single or 3-phase. | I   |
|           | 7   | AC2   |   | I   |
|           | 8   | AC3   |   | I   |

CN4 - Motor Feedback Connector:

| CONNECTOR | PIN | NAME       | DESCRIPTION  | I/O  |
|-----------|-----|------------|--|------|
| CN4       | 1   | COS +      | Cosine input. Voltage range: 2 – 3.4 VDC. Frequency range: DC – 200kHz   | I    |
|           | 2   | COS -      |  | I    |
|           | 3   | SIN +      | Cosine input. Voltage range: 2 – 3.4 VDC. Frequency range: DC – 200kHz   | I    |
|           | 4   | SIN -      |  | I    |
|           | 5   | SGND       | Signal ground  | SGND |
|           | 6   | +Hall A    | Commutation sensor inputs. Internal 2K pull-up to +5VDC. Can be used with single ended or differential Hall sensors. | I    |
|           | 7   | -Hall A    |  | I    |
|           | 8   | +Hall B    | Commutation sensor inputs. Internal 2K pull-up to +5VDC. Can be used with single ended or differential Hall sensors. | I    |
|           | 9   | -Hall B    |  | I    |
|           | 10  | +5V OUT    | +5V @ 250mA max. Short-circuit protected.  | O    |
|           | 11  | +Hall C    | Commutation sensor inputs. Internal 2K pull-up to +5VDC. Can be used with single ended or differential Hall sensors. | I    |
|           | 12  | -Hall C    |  | I    |
|           | 13  | REF MARK + | Reference mark from sine/cosine encoder  | I    |
|           | 14  | NC         | Not connected  |      |
|           | 15  | REF MARK - | Reference mark from sine/cosine encoder  | I    |

CN3 – I/O Connector:

| CONNECTOR | PIN | NAME             | DESCRIPTION   | I/O    |
|-----------|-----|------------------|---|--------|
| CN3       | 1   | USER OUTPUT 0    | Programmable digital output. Isolated, 24VDC, referenced to USER GND  | O      |
|           | 2   | USER OUTPUT 1    | Programmable digital output. Isolated, 24VDC, referenced to USER GND  | O      |
|           | 3   | USER GND         | Ground reference for user outputs and inputs.   | GND    |
|           | 4   | NODE ALARM       | SynqNet network error. Isolated, 24VDC, referenced to USER GND  | O      |
|           | 5   | BRAKE            | Brake output, controlled directly via SynqNet. Isolated, 24VDC, referenced to USER GND  | O      |
|           | 6   | AGND             | Analog ground   | AGND   |
|           | 7   | + DIFF. INPUT 0  | Differential input. 5V TTL., non-isolated. Programmable function: capture   | I      |
|           | 8   | - DIFF. INPUT 0  |   | I      |
|           | 9   | OUTPUT PULL-UP   | 5K Pull-up for user outputs.  | I      |
|           | 10  | NODE DISABLE     | Node disable input. Isolated, 24VDC range. Referenced to sensor common (SENSCOMMON).  | I      |
|           | 11  | LIMIT +          | Positive limit input. Isolated, 24VDC range. Referenced to sensor common (SENSCOMMON).  | I      |
|           | 12  | LIMIT -          | Negative limit input. Isolated, 24VDC range. Referenced to sensor common (SENSCOMMON).  | I      |
|           | 13  | HOME             | Home switch input. Isolated, 24VDC range. Referenced to sensor common (SENSCOMMON).   | I      |
|           | 14  | USER INPUT 0     | Programmable digital input. Isolated, 24VDC, referenced to USER GND   | I      |
|           | 15  | USER INPUT 1     | Programmable digital input. Isolated, 24VDC, referenced to USER GND   | I      |
|           | 16  | SENSCOMMON       | Sensor common. Used with E-stop, limit +, limit -, and home inputs. Can be used as a ground reference or as a pull-up for these inputs. | COMMON |
|           | 17  | + DIFF. INPUT 1  | Differential input. 5V TTL., non-isolated. Programmable function: capture   | I      |
|           | 18  | - DIFF. INPUT 1  |   | I      |
|           | 19  | SGND             | Digital ground  | SGND   |
|           | 20  | + DIFF. OUTPUT 0 | Differential output. 5V TTL., non-isolated. Programmable function: step&dir, divide-by-N  | O      |
|           | 21  | - DIFF. OUTPUT 0 |   | O      |
|           | 22  | + DIFF. OUTPUT 1 | Differential output. 5V TTL., non-isolated. Programmable function: step&dir, divide-by-N  | O      |
|           | 23  | - DIFF. OUTPUT 1 |   | O      |
|           | 24  | +ANALOG IN       | Programmable, differential analog input, +/- 10V range, 14-bit.   | I      |
|           | 25  | -ANALOG IN       |   | I      |
|           | 26  | AGND             | Analog ground.  | AGND   |

CN1 – SYNQNET™ INTERFACE:

| CONNECTOR | PIN        | NAME | DESCRIPTION          | I/O |
|-----------|------------|------|----------------------|-----|
| CN1       | 1          | RD+  | 100BaseT receiver    | I   |
|           | 2          | RD-  |                      | I   |
|           | 3          | TD+  | 100BaseT transmitter | O   |
|           | 6          | TD-  |                      | O   |
|           | 4, 5, 7, 8 | N/C  | Not connected        |     |

CN2 – SYNQNET™ INTERFACE:

| CONNECTOR | PIN        | NAME | DESCRIPTION          | I/O |
|-----------|------------|------|----------------------|-----|
| CN2       | 1          | TD+  | 100BaseT transmitter | O   |
|           | 2          | TD-  |                      | O   |
|           | 3          | RD+  | 100BaseT receiver    | I   |
|           | 6          | RD-  |                      | I   |
|           | 4, 5, 7, 8 | N/C  | Not connected        |     |

**ORDERING INFORMATION:**

Standard model: DQ111SE30A40NACX-H

X indicates the current revision letter.

**MOUNTING DIMENSIONS:**

