

Please note that on the January 1st, 1998 Sprint Electric Corporation changed its name to Bardac Corporation. The products covered by this manual are identical to those of the same model number and version supplied with the Sprint Electric name.

~~Power~~SLE NON-REVERSING, 2-QUADRANT DC DRIVE

BASIC START MANUAL

~~Power~~ SLE DRIVES VERSION 1.1

Please read this manual completely before attempting to install and start up the drive.

In familiarizing yourself with the drives, it is essential to start with a basic speed controlled set up before attempting to introduce sophistication to your system. In this way the start up can be accomplished safely and reliably in progressive easy stages.

All drives are complex technical products with different features, characteristics and safety requirements and it is therefore essential to follow these instructions in detail to ensure successful operation.

Safety ...

Drives and process control systems are a very important part of creating better quality and value in the goods for our society, but they must be designed, installed and used with great care to ensure everyone's SAFETY. Remember that the equipment you will be using incorporates ...

*High voltage electrical devices
Powerful rotating machinery
Heavy components*

... involving ...

*Hazardous materials
Expensive plant
Interactive processes*

Always use qualified personnel to design, construct, operate and maintain your systems and keep SAFETY as your primary concern. Thorough personnel training is an important aid to SAFETY and productivity. SAFETY awareness not only reduces the risk of accidents and injuries in your plant, but has a direct impact on improving product quality and costs. If you have any doubts about the SAFETY of your system or process, consult an expert before proceeding with the project.

Environment ...

This equipment is designed as a component to be used in a variable speed DC motor control system, and must be installed in a suitable electrical protective enclosure together with the appropriate additional safety and control components. This equipment is suitable only for installation in a safe, clean, non-hazardous environment. It is assumed that the customer will take full responsibility for ensuring that the equipment supplied and the installation meet all the necessary codes and safety standards.

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Basic Start

This manual is intended to supplement the detail manual for the SLE series of 3-phase DC drives by identifying the basic requirements for start up. It is not intended to replace the detail manual and it is very important to refer to this manual throughout the start up and operation of the drives.

**FOR SUCCESSFUL START UP IT IS ESSENTIAL TO FOLLOW THESE
BASIC STEPS COMPLETELY AND IN SEQUENCE**

**PLEASE DO NOT HESITATE TO CALL US AT (703) 834-3100 IF YOU NEED
ANY HELP OR ASSISTANCE**

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STEP 1: Basic Specification

Define the following data for reference in setting up and checking out the drive installation:

3-PHASE POWER

_____ VOLTS, 50 - 60 Hz
SHORT CIRCUIT CAPACITY _____ AMPS (A.I.C.)

ENVIRONMENT

MAX TEMP. INSIDE DRIVE ENCLOSURE _____ °C
ATMOSPHERE: CLEAN - DUST - WET - HAZARDOUS

DC SHUNT MOTOR (Nameplate Data)

_____ HORSEPOWER
_____ BASE RPM _____ MAX RPM
_____ ARMATURE VOLTS _____ AMPS
_____ FIELD VOLTS _____ AMPS
TACH FITTED? YES - NO _____ VOLTS/1000RPM
_____ VOLTS AT FULL SPEED
THERMOSTAT FITTED? YES - NO

DRIVE

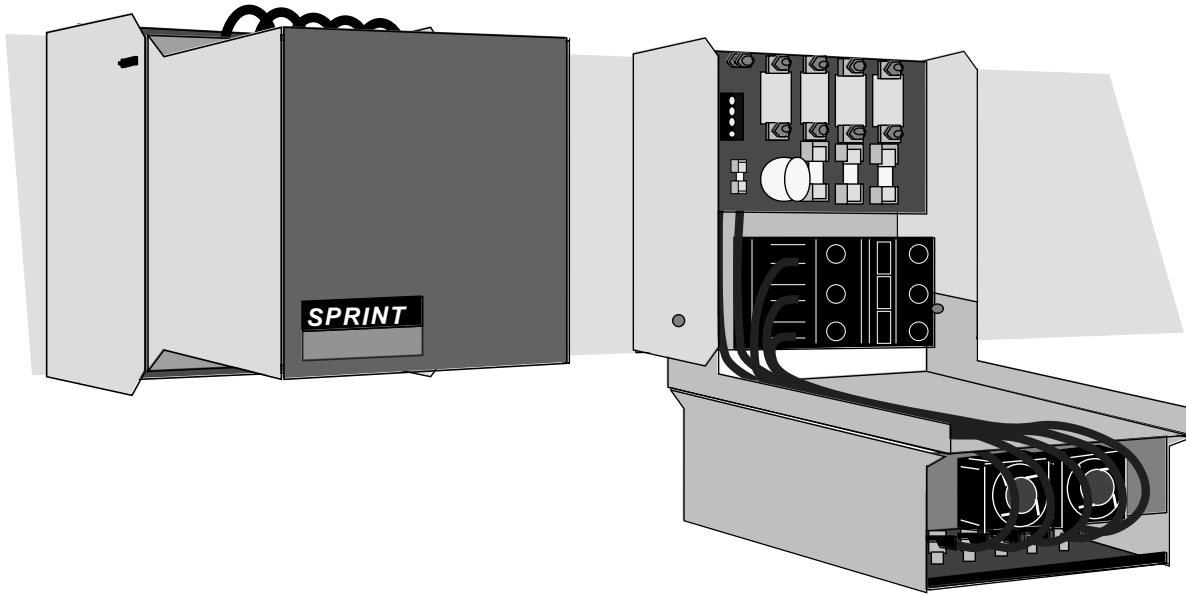
MODEL NUMBER ~~power~~ _____
SERIAL NUMBER _____

SECTION DESCRIPTION

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STEP 2: Basic Installation

It is essential to start with a basic installation which can be checked out thoroughly before proceeding to a customized system installation. Please follow all of the following steps carefully.





STEP 2.1 MAKE SURE THAT ALL ELECTRICAL POWER IS TOTALLY DISCONNECTED FROM THE EQUIPMENT AND THAT ANY ISOLATING SWITCHES ARE SAFELY LOCKED OFF.

STEP 2.2 Mount the unit securely to the control enclosure back panel by means of M6 (or 1/4") bolts through the panel, with nuts and lock-washers.

Keyhole slots are provided to aid the mounting process by allowing the drive to be hung in position before tightening the mounting bolts.

The mounting centers are 6.85" (174mm) wide, by 10.25" (260mm) high. Unit weight is approximately 25 pounds (11 kilograms).

Leave free space for ventilation and access, above and below the unit. Leave 4" (100mm) above, and 7" (175mm) below. Allow at least 11" (280mm) depth clearance. Refer to detail manual for heat dissipation and ventilation requirements.

| | | |
|---|--------------------------------|---|
|  | Footprint |  |
| | 8"x11" (203x280mm) | |
| | Depth | |
| | Closed 9.25" (236mm) | |
| | Open 14" (355mm) max. | |
| | Mounting hole centers | |
| | 6.85"x10.25" | |
| | (174x260mm) | |
| | Ventilation & access clearance | |
| | 4" (100mm) above, | |
| | 7" (175mm) below. | |

STEP 2.3 Uncouple the motor from the load so that it can rotate freely and safely

STEP 2: Basic Installation

STEP 2.4 The 3-phase power terminals, 115 volts control supply, armature and field connections are accessed by hinging the ~~power~~ drive open as shown ...

To open and close the unit, proceed as follows:

To open ... release the catches at the upper sides of the unit by lifting the projecting latch spring ends upwards. Lower the top portion of the drive control unit until it is held by its retaining stops.

To close ... swing back into the vertical position, press firmly into position and check that the latch springs are fully engaged into the retaining slots.

STEP 2.5 Power Supplies

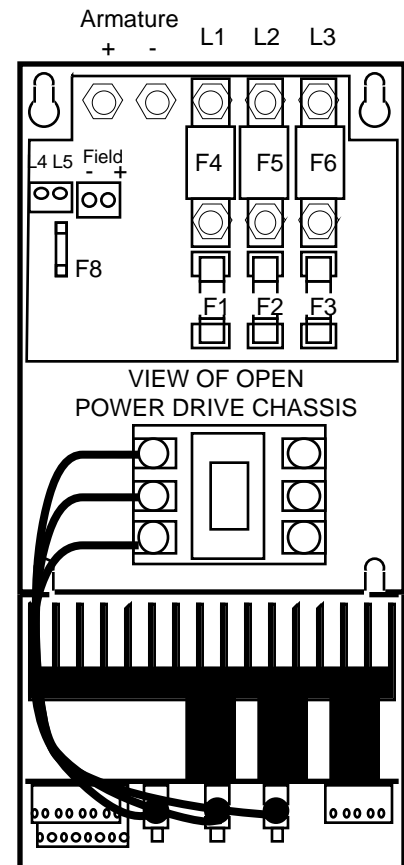
The drives can be configured for two ranges of supply nominally 240 volts and 480 volts, 3-phase, and are 50/60Hz auto ranging. (see STEP 3, Basic Drive Configuration, Power Board).

The unit also requires a 115 volts, 1 amp control supply.

The 240 volts configuration covers the range 200 to 240V, +/-5%

The 480 volts configuration covers the range 380 to 480V, +/-5%

The required control voltage is 120V, 60Hz, or 110V, 50Hz.



IMPORTANT NOTE: Correct rating of the supplies is essential for safe reliable operation

AC distribution fuses, breakers, power cabling, etc., should be rated for a continuous current capacity of 1.5 to 2, times the nominal full load DC current of the drive.

STEP 2.6 Power Quality

It is strongly recommended that each three phase drive is installed with either a Line Reactor or a Drive Isolating Transformer connected into the main power supply. The purpose of this is to ensure a defined line impedance thereby reducing both the level of SCR induced "notching" on the supply and the total radiated electromagnetic RF noise. In most industrial systems the choice of line reactor or transformer will depend on other considerations such as the need for isolation to provide added system safety.

In many instances, it will also be necessary to install a 3-phase Line Filter, type LF3, to both reduce the effects of drive induced transients on the line, and improve the immunity of the drive to disturbances on the supply such as lightning induced surges, "brownouts", "blackouts", etc.. (See "Power Quality" in STEP 5.7)

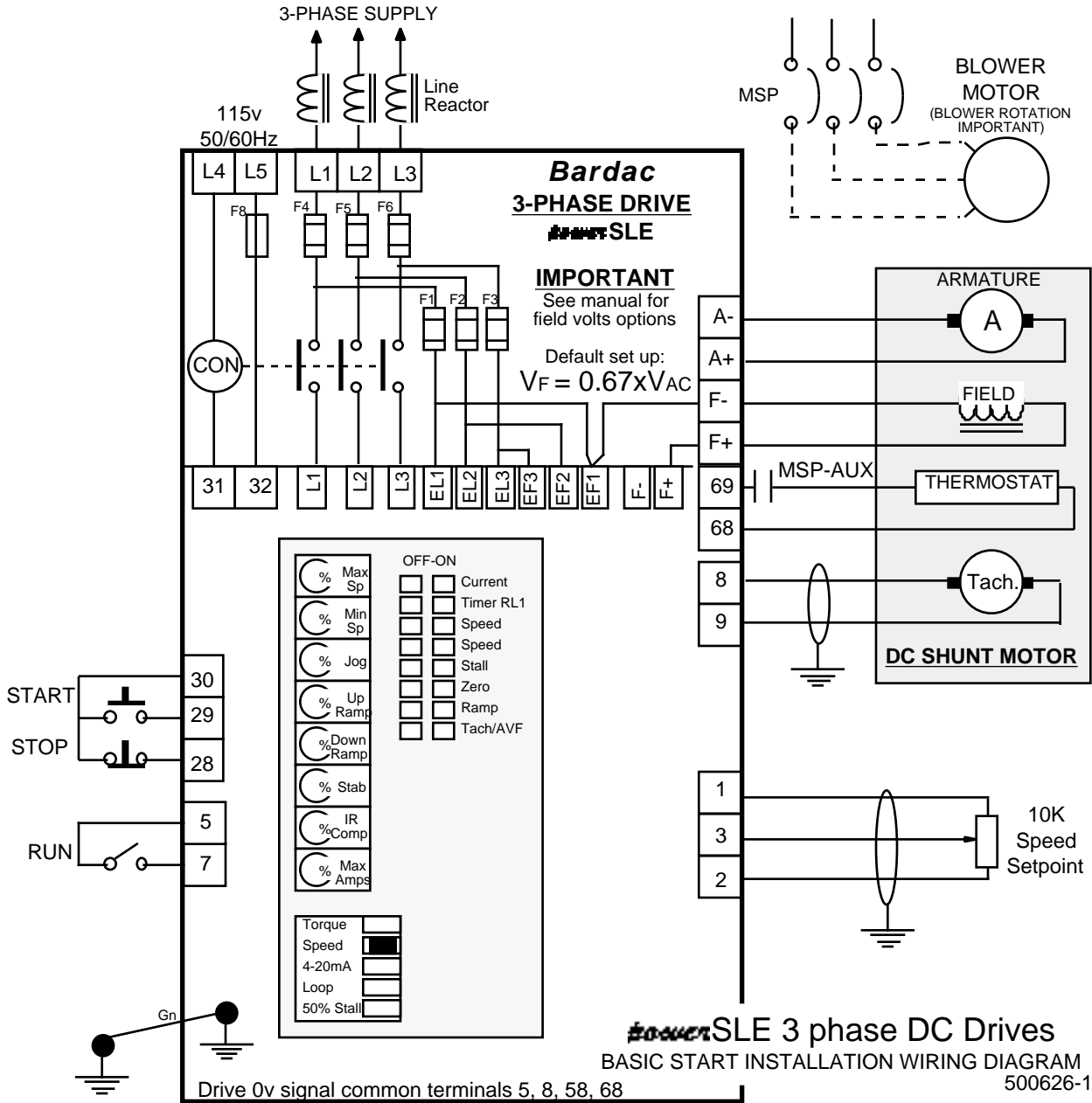
See Appendix 2 for details of Line Reactors, Drive Isolation Transformers and Line Filters.

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STEP 2: Basic Installation

STEP 2.7 Remove all wiring from the drive except the basic wiring configuration shown in either of the following diagram for the ~~power~~SLE drives:

NOTE: Tightening torque for 3-phase power and armature connections: 35 lbs. ins. (3.9 NM)



Field Voltage Configuration

The factory default set up for the field gives Field Volts (V_F) = 0.67 x Line AC Voltage (V_{AC})

For 460 volts 3-phase supply this gives Field Volts (V_F) = 300 VDC

For 230 volts 3-phase supply this gives Field Volts (V_F) = 150 VDC

~~power~~SLE SERIES, BASIC START MANUAL - VERSION 1.1

For alternative voltages see **Motor Armature & Field Connections** information on page 7.

STEP 2: Basic Installation

STEP 2.8 Fuse Protection

The unit is fitted with the required special high speed semiconductor fuses. If these fuses are to be replaced for any reason, it is essential to install the correct high speed fuses. The fuse specifications are shown in Appendix 1 and on the rating label inside the drive.

No alternative fuses are acceptable unless approved by Bardac. Use of any other fuse type will invalidate the product warranty.

STEP 2.9 Motor Armature & Field Connections

ARMATURE The armature currents for standard horsepower motors are given in Appendix 1, and the standard motor voltages are as follows:

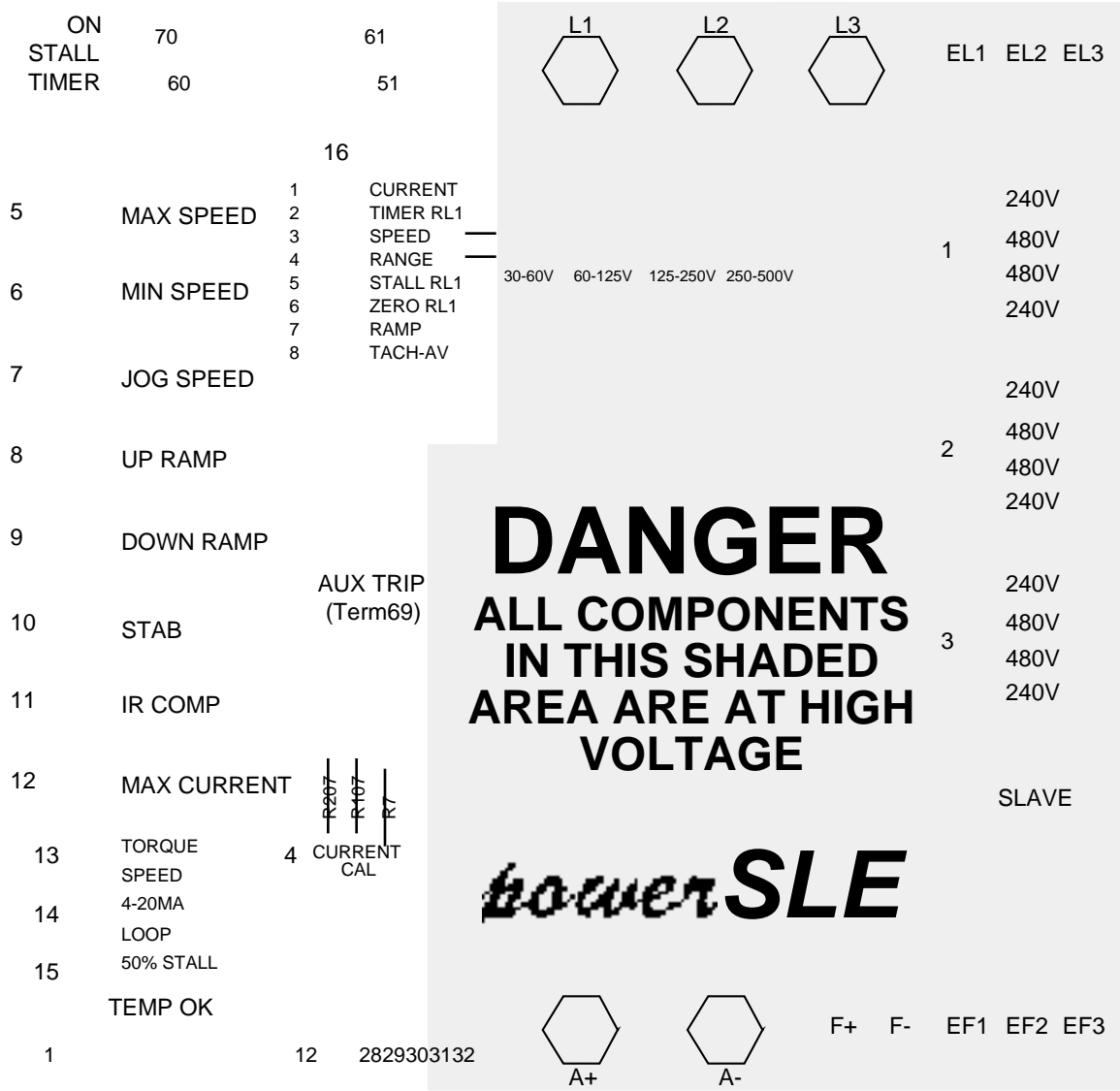
| <u>FOR 3-PH POWER VOLTS</u> | <u>ARMATURE VOLTS</u> | <u>FIELD VOLTS</u> |
|-----------------------------|-----------------------|--------------------|
| North America | | |
| 460-480 volts AC | 500 Volts DC | 300 Volts DC |
| 220-240 volts AC | 240 Volts DC | 150 Volts DC |
| Europe | | |
| 380-415 volts AC | 420-460 Volts DC | 320-360 Volts DC |

FIELD The built in field rectifier bridge has a maximum rating of 2.5 amps, and can be configured to meet the requirements of most combinations of international standard power supplies and motor field voltages (see the SLE Controller manual for details). The basic options are shown below: The North American factory default shipment configuration is shown in the shaded area.

| AC Connections | Field Connections | AC Volts | = | 120 | 208 | 240 | 380 | 415 | 460 |
|--------------------------|-------------------|------------|----------------------|-----|-----|-----|-----|-----|-----|
| 2-phase AC on EF2 & EF3 | F+ & F- | DC $V_F =$ | $0.9 \times V_{AC}$ | 108 | 187 | 216 | 342 | 373 | 414 |
| 2-phase AC on EF2 & EF3 | F+ & EF2 | DC $V_F =$ | $0.45 \times V_{AC}$ | 54 | 94 | 108 | 171 | 187 | 207 |
| 3-ph AC on EF1, EF2, EF3 | F+ & F- | DC $V_F =$ | $1.35 \times V_{AC}$ | 162 | 218 | 324 | 513 | 560 | 621 |
| 3-ph AC on EF1, EF2, EF3 | F+ & EF1 | DC $V_F =$ | $0.67 \times V_{AC}$ | 81 | 140 | 162 | 256 | 280 | 310 |

IMPORTANT: It is essential to ensure that both armature and field wiring is rated for at least 1.5 times full load current and that all connections are securely made. Poor connections or interruptions of either field or armature currents can be dangerous and can cause severe damage to the drive.

STEP 3: Basic Drive Configuration



The powerSLE drive has user definable features which must be set up before operation.

The following table lists these features and shows the SHIPMENT DEFAULT SETTINGS and the required BASIC START SETTINGS.

The CUSTOMIZED SETTINGS column is for you to record your final settings.

The locations of the various pots, links and switches are shown on the drawing above.

WARNING ... The unit has exposed components which are at a dangerous high voltage. Always stop the drive and turn all power off when making adjustments.

STEP 3: Basic Drive Configuration

There are 6 jumper plugs on the top control board that must all be selected correctly for the required operating voltage. The jumper plugs must be pressed firmly into position to ensure a reliable long term connection.

| powerSLE | | | | | |
|----------------------------|---|--------------|--|--|--------------------------|
| Item No. | Description | Link Cal Pot | SHIPMENT DEFAULT SETTING | BASIC START SETTING | FINAL CUSTOMIZED SETTING |
| 1 | CONTROL VOLTS PH-1 CAUTION WRONG VOLTAGE WILL CAUSE SERIOUS DAMAGE TO THE UNIT | Link | 240V - OPEN 480V - LINK 480V - LINK 240V - OPEN | 240V - ____ 480V - ____ 480V - ____ 240V - ____ | |
| 2 | CONTROL VOLTS PH-2 CAUTION WRONG VOLTAGE WILL CAUSE SERIOUS DAMAGE TO THE UNIT | Link | 240V - OPEN 480V - LINK 480V - LINK 240V - OPEN | 240V - ____ 480V - ____ 480V - ____ 240V - ____ | |
| 3 | CONTROL VOLTS PH-3 CAUTION WRONG VOLTAGE WILL CAUSE SERIOUS DAMAGE TO THE UNIT | Link | 240V - OPEN 480V - LINK 480V - LINK 240V - OPEN | 240V - ____ 480V - ____ 480V - ____ 240V - ____ | |
| 4 | ARMATURE CURRENT CALIBRATION RESISTORS (SEE APPENDIX 1) | Cal | SEE RATING APPENDIX 1 | R7_____ R107_____ R207_____ | |

Control Configurations:

| | | | | | |
|----|-----------------------------------|------|-----------|---------------|--|
| 5 | MAX SPEED | pot | MIN<<<< | MIN<<<< | |
| 6 | MIN SPEED | pot | MIN<<<< | MIN<<<< | |
| 7 | JOG SPEED | pot | MIN<<<< | MIN<<<< | |
| 8 | UP RAMP | pot | >>>>FAST | >>MID<< | |
| 9 | DOWN RAMP | pot | >>>>FAST | >>MID<< | |
| 10 | STAB -SPEED STABILITY | pot | >>MID<< | >>MID<< | |
| 11 | IR COMPENSATION | pot | MIN<<<< | MIN<<<< | |
| 12 | MAX CURRENT | pot | >>>>MAX | MIN<<<< | |
| 13 | TORQUE - SPEED TORQUE SPEED | link | LINK | LINK(INITIAL) | |
| 14 | 4 - 20 mA | link | OPEN | OPEN | |
| 15 | 50% STALL | link | OPEN | OPEN | |
| 16 | OPTION SWITCHES | sw | | | |
| | CURRENT (50% OFF) 1 | | >>ON 100% | >>ON 100% | |
| | TIMER RL1 2 | | OFF<< | OFF<< | |
| | SPEED RANGE 3 | | >>ON | SET TO ARM V | |
| | SPEED RANGE 4 | | >>ON | SET TO ARM V | |
| | STALL RL1 5 | | OFF<< | OFF<< | |
| | ZERO RL1 6 | | OFF<< | OFF<< | |
| | RAMP (ON - ENABLE) 7 | | >>ON | >>ON | |
| | TACH - ARM VOLTS 8 | | >>ON | >>ON | |

STEP 4: *Essential Checks*

Before powering up the drive it is essential to check the following:

1. Check that the motor is uncoupled and can be safely rotated.
2. Check the 3-phase supply voltage and check drive voltage rating set up.
3. Check the 115v control voltage.
4. Check the drive current calibration (see Appendix 1).
5. Check the drive configuration (see STEP 3).
6. Check the high speed fuse specifications (see Appendix 1).
7. Check the wiring: Circuit same as ~~400v~~ SLE BASIC START Wiring Diagram 500626
 All connections tight,
 All cables and components rated correctly and installed to required codes
8. Check the installation for short circuit fault conditions:
 AC power wiring to ground or control wiring,
 DC power wiring to ground or control wiring,
 Control wiring to ground.
9. Check the installation for cleanliness and ensure that it is free of debris such as wire clippings, metal chips, tools, etc.
10. Check that the enclosure is adequately ventilated with clean filtered air and that there is no risk of exposure to moisture or condensation or other hazardous materials.

STEP 5: Basic Power Up

5.1 Power On

Turn on both the 115v control supply and the main 3-phase supply and carry out the following checks:

IF THERE IS ANY DOUBT ABOUT THESE CHECKS OR IF ANY ALARM CONDITIONS ARE INDICATED, TURN THE POWER OFF IMMEDIATELY AND REPEAT THE BASIC START STEPS 1 THROUGH 4

| VOLT METER CHECKS |
|--|
| 1. Check the 3-phase supply volts at the incoming drive terminals L1, L2, L3 |
| 2. Check the 115v control voltage |
| 3. Check the 24 volts DC drive internal PSU, terminals 67 (+24v) & 68 (common) |
| 4. Check the +12 volts rail, terminals 61 (+12v) & 68 (common) |
| 5. Check the -12 volts rail, terminals 63 (-12v) & 68 (common) |
| 6. Check the +10 volts rail, terminals 1 (+10v) & 5 (common) |
| 7. Check the SPEED SETPOINT REFERENCE, terminals 3 & 5 (common) |
| 8. Check the DC field voltage |

IMPORTANT!

1. NOW THAT THE POWER HAS BEEN TURNED ON, REMEMBER THAT IT IS ESSENTIAL TO STOP THE DRIVE AND TURN THE POWER OFF BEFORE MAKING ANY ADJUSTMENTS, CONNECTIONS OR CONFIGURATION CHANGES.
2. NEVER TURN THE 115V CONTROL SUPPLY ON OR OFF WHILE THE 3-PHASE POWER IS ON. SERIOUS EQUIPMENT DAMAGE MAY RESULT.

STEP 5: Basic Power Up

5.2 Set Up Armature Control

| VOLT METER CHECKS |
|--|
| 1. Set speed setpoint pot to zero, (Terminal 3 = 0v) |
| 2. Set Max current pot to zero, (fully counterclockwise) |
| 3. Operate the drive "START", and observe main contactor operation |
| 4. Operate drive "STOP" |
| 5. Move the TORQUE/SPEED link from the TORQUE position to the SPEED position |
| 6. Operate the drive "START" increase the speed pot to 10% and observe that the stall timer light may operate |
| 7. Carefully increase the MAX CURRENT pot to 10% and check that the motor starts to rotate in the right direction and at a controlled speed. |
| <i>If not, immediately</i> <ol style="list-style-type: none">Operate drive STOPTurn off all powerReverse the field connections to reverse motor direction.Turn on the power againRepeat Armature set up procedure |
| 8. Operate drive "START" and observe motor rotation. <ol style="list-style-type: none">Increase speed setpoint slowly taking care to ensure that the motor does not goset the MAX SPEED pot for the correct full speed operation of the motor |
| 9. Operate the drive "STOP" |
| 10. Turn off all power |

Having completed the BASIC START procedure you may now proceed to customize your system to suit your specific application. It is most important to refer to the Model SLE Controller detail product manuals throughout the process of designing and testing your system. The drives incorporate many features to enable them to meet a wide variety of applications. Please do not hesitate to call us if we can provide any help or advice on how to best achieve your application requirements.

APPENDIX 1 Calibration & Fuses

| MOTOR HORSEPOWER RATINGS AT | | DRIVE RATINGS AT 50°C AMBIENT WITH 150% LOAD FOR 30 SECS | | | ARMATURE CURRENT CAL RESISTORS & 50% SWITCH S1 | | | | RECOMMENDED FUSES | | | | | LINE REACTOR TYPE |
|-----------------------------|----------|--|-----------|-------------|--|------|------|--------|---------------------|--------|------------|---------------------|-------|-------------------|
| 500v Arm | 240v Arm | MODEL TYPE | Arm. Amps | Watts Diss. | R207 | R107 | R7 | 50% sw | AC POWER & ARMATURE | | | CONTROL | | |
| | | | | | | | | | Gould | Buss | Littelfuse | Gould | Buss | |
| | | | | | | | | | fitted on base unit | | | fitted on base unit | | external |
| 5 | 2 | SLE14 | 9 | 100 | 27K | 39K | 16K | OFF | A50P30 | FWH30 | L50S30 | A50P10 | FWH10 | LR48 |
| 10 | 5 | SLE14 | 18 | 150 | 27K | 39K | 16K | ON | A50P30 | FWH30 | L50S30 | A50P10 | FWH10 | LR48 |
| 10 | 5 | SLE14 | 17 | 150 | 27K | 39K | | OFF | A50P30 | FWH30 | L50S30 | A50P10 | FWH10 | LR48 |
| 20 | 10 | SLE14 | 34 | 200 | 27K | 39K | | ON | A50P30 | FWH30 | L50S30 | A50P10 | FWH10 | LR48 |
| 10 | 5 | SLE24 | 22 | 150 | 27K | 82K | | OFF | A50P60 | FWH60 | L50S60 | A50P10 | FWH10 | LR48 |
| 25 | 12 | SLE24 | 43 | 250 | 27K | 82K | | ON | A50P60 | FWH60 | L50S60 | A50P10 | FWH10 | LR48 |
| 15 | 7.5 | SLE24 | 29 | 200 | 27K | | | OFF | A50P60 | FWH60 | L50S60 | A50P10 | FWH10 | LR48 |
| 30 | 15 | SLE24 | 58 | 300 | 27K | | | ON | A50P60 | FWH60 | L50S60 | A50P10 | FWH10 | LR120 |
| 20 | 10 | SLE34 | 35 | 200 | | 39K | 220K | OFF | A50QS100 | FWH100 | L70S100 | A50P10 | FWH10 | LR48 |
| 40 | 20 | SLE34 | 70 | 350 | | 39K | 220K | ON | A50QS100 | FWH100 | L70S100 | A50P10 | FWH10 | LR120 |
| 25 | 10 | SLE34 | 41 | 250 | | 39K | | OFF | A50QS100 | FWH100 | L70S100 | A50P10 | FWH10 | LR48 |
| 50 | 25 | SLE34 | 82 | 400 | | 39K | | ON | A50QS100 | FWH100 | L70S100 | A50P10 | FWH10 | LR120 |
| 30 | 15 | SLE44 | 53 | 300 | | | 47K | OFF | A50QS100 | FWH100 | L70S100 | A50P10 | FWH10 | LR48 |
| 60 | 30 | SLE44 | 106 | 450 | | | 47K | ON | A50QS100 | FWH100 | L70S100 | A50P10 | FWH10 | LR120 |

AUXILIARY 115v CONTROL FUSE All units are fitted with an auxiliary 115v control fuse adjacent to the 115v terminals. This is a 2 amps, 5x20mm, Fast Acting 250V, instrument fuse, (IEC 127 Sheet II, UL 198G, CSA C22.2 N59)

LOCATION OF FUSES see page 5

LOCATION OF CURRENT CAL RESISTORS see page 8.
(for further information on current calibration see the SLE Controller Manual).

IMPORTANT

It is essential to use only the fuses specified in the above table to ensure adequate protection of the drives.

No substitutes are acceptable unless approved by Bardac.

The use of any other fuses automatically invalidates the product warranty.

If you need assistance with fuse information please call (410) 604-3400.

APPENDIX 2 Power Components

Three Phase Line Reactors

These are open construction for use only in a protected enclosure. Please refer to the factory for dimensions and detail specifications.

| Catalog Number | Max. hp. at 230VAC | Max. hp. at 460VAC | Drive Max. DC Amps |
|----------------|--------------------|--------------------|--------------------|
| LR48 | 15 | 30 | 48 |
| LR120 | 37 | 75 | 120 |

Three Phase Drive Isolating Transformers

All the three phase drive isolating transformers are in NEMA 1, floor standing, ventilated enclosures suitable for indoor use.

Standard Features: Windings: Delta Primary, Wye Secondary, 2 taps, +5% -5%

Please refer to the factory for dimensions and detail specifications and further options.

| Primary Volts | | 230VAC | | 460VAC | | 575VAC | |
|-----------------|-----|-----------------|---------|---------|---------|---------|---------|
| Secondary Volts | | 230 | 460 | 230 | 460 | 230 | 460 |
| hp | KVA | Catalog Numbers | | | | | |
| 5 | 7.5 | DIT722 | DIT724 | DIT742 | DIT744 | DIT752 | DIT754 |
| 7.5 | 11 | DIT1122 | DIT1124 | DIT1142 | DIT1144 | DIT1152 | DIT1154 |
| 10 | 14 | DIT1422 | DIT1424 | DIT1442 | DIT1444 | DIT1452 | DIT1454 |
| 15 | 20 | DIT2022 | DIT2024 | DIT2042 | DIT2044 | DIT2052 | DIT2054 |
| 20 | 27 | DIT2722 | DIT2724 | DIT2742 | DIT2744 | DIT2752 | DIT2754 |
| 25 | 34 | DIT3422 | DIT3424 | DIT3442 | DIT3444 | DIT3452 | DIT3454 |
| 30 | 40 | DIT4022 | DIT4024 | DIT4042 | DIT4044 | DIT4052 | DIT4054 |
| 40 | 51 | DIT5122 | DIT5124 | DIT5142 | DIT5144 | DIT5152 | DIT5154 |
| 50 | 63 | DIT5022 | DIT5024 | DIT5042 | DIT5044 | DIT5052 | DIT5054 |
| 60 | 75 | DIT7522 | DIT7524 | DIT7542 | DIT7544 | DIT7552 | DIT7554 |

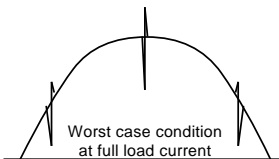
3-Phase Line Filter, LF3

This unit is a 3-phase Resistor/Capacitor/Diode Bridge network designed to reduce the drive induced switching transients on the power supply. The need for a line filter can be determined by performing a line analysis described below. In general, one LF3 Line Filter can be used with multiple drives to ensure that the power quality is satisfactory if, the (total horsepower) x (number of drives) is less than 150. Please call for further information.

Determining the need for a line filter:

Examine the three phases with an oscilloscope under worst case motor load conditions. Drive switching transients must never exceed an instantaneous max. voltage of 1.25 x the normal phase peak volts (1000 volts absolute maximum). If this is exceeded, a Line Filter will be required. Multiple units can be added to the 3-phase power lines to ensure that the power quality is satisfactory.

(Warning! be sure to use an isolated probe with the oscilloscope when working at high voltage)



APPENDIX 3

Drive Terminal Lists

| TERM No. | NAME | DESCRIPTION |
|----------|--------------------------------------|--|
| 1 | +10 Volt Reference | +10 volts (10mA max out.) |
| 2 | Min Speed / 4-20mA | Bottom of speed pot or 4-20mA input (see manual) |
| 3 | Speed Input - Ramped | 0 to +10 volts equals 0 to 100% speed (50K input impedance) |
| 4 | 0 Volts - Common | 0 Volts |
| 5 | 0 Volts - Common | 0 Volts |
| 6 | Auxiliary Input - Ramped | 0 to +10 volts Speed or torque command (50K input impedance) |
| 7 | Run | close to 0v to run |
| 8 | 0 Volts - Common | 0 Volts (Use for Tach +V) |
| 9 | Tach Input | (Use for Tach -V) |
| 10 | Relay 1 NC | See Manual |
| 11 | Relay 1 NO | See Manual |
| 12 | Relay 1 Arm | See Manual |
| 28 | Power Off | Open to release Contactor |
| 29 | Contactor On | Close to 28 for Contactor On |
| 30 | Contactor Latch | 0 Volts |
| 31 | Contactor Coil Switch | Factory Wired Contactor |
| 32 | Contactor Coil Switch | Factory Wired Contactor |
| 51 | -24 Volts Unregulated | -20 to -30 volts depending on external load Max Load 25mA (Output unprotected) |
| 52 | Stall Relay Driver | 1.5 volts when activated PNP Open Collector Max Rating, -30V, 25mA |
| 53 | Zero Speed Relay Driver | 1.5 volts when activated (above 5% FWD) PNP Open Collector Max Rating, -30V, 25mA |
| 54 | Current Command Output | 0 to 5 volts equals 0 to 100% armature current (1K output impedance) |
| 55 | Ramp Output | 0 to +10 volts = sum of all speed inputs (1K output impedance) |
| 56 | Speed output (scaled by Max Spd pot) | 0 to +7.5/9 Volts equals 0 to 100% speed (1K output impedance) |
| 57 | Total Speed Command Out | 0 to -10 volts, equals Zero to 100% FWD speed (1K output impedance) |
| 58 | 0 Volts - Common | 0 Volts |
| 59 | Armature Volts Output | 0 to -5 volts equals 0 to 100% Arm V (1K output impedance) |
| 60 | Timer Relay Driver | 1.5 volts when activated PNP Open Collector Max Rating, -30V, 25mA |
| 61 | +12 Volts Reference | +12 volts (10mA Max) |
| 62 | Stall Alarm Set/Reset | Connect to +12V to Reset, Connect to -12V to Set |
| 63 | -12 Volts Reference | -12 volts (10mA Max) |
| 64 | Alt/Jog.Speed Output | -12 to +12volts (10K Output impedance) |
| 65 | Inverting Speed Input Ramped input | 0 to -10 volts, equals Zero to 100% FWD speed (100K input impedance) |
| 66 | Non-Inverting Speed Ramped input | -10 to +10 volts, equals Bi-polar speed reference (50K input impedance) |
| 67 | +24 Volts Unregulated | +20 to +30 volts depending on ext load Max Load 25mA (Output unprotected) |
| 68 | 0 Volts - Common | 0 Volts |
| 69 | External Trip | (Motor Thermostat - trips if resistance to 0V > 2K ohms) |
| 70 | Auxiliary Speed Input | -10 to +10 volts Speed command (470K input impedance) |

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APPENDIX 4 DC Tachometer Setup and Speed Scaling

Note: DC Tachometer feedback is a standard feature in the SLE series drives. Please consult factory if an AC tach is to be used (see Appendix 5.)

1. Before setting up the drive for tach feedback the drive should first be run in armature volts feedback to ensure proper operation.
2. Turn off all power.
3. Turn the MAX CURRENT potentiometer and the MAX SPEED pot down to zero (fully counter clockwise.)
4. Set DIP SWITCHES 3 & 4 for maximum tach voltage.

EXAMPLE: If a tach is rated 50 V/1000 and maximum desired speed of motor is 1750 RPM the maximum tach voltage is:

$$\frac{50V}{1000 \text{ RPM}} \times 1750 \text{ RPM} = 87.5V$$

So the maximum feedback of the tachometer is 87.5 volts. Dip Switches 3 & 4 should be set to the 50-100V range.

5. Turn DIP SWITCH 8 off to enable tach feedback.
6. Check tach wiring into terminal 8 & 9. Tach wires should be shielded with shield grounded at one end. Tach coupling should be stiff with no slip.
7. Set speed setpoint pot to zero (Terminal 3 = 0v)
8. Turn power back on.
9. Operate the drive "START" and close "RUN" Increase the speed pot to 10%. The Stall Timer light should operate and the motor should not turn.
10. Carefully increase the MAX CURRENT pot to 10% and check that the motor starts to rotate at a controlled speed. Be prepared to hit STOP if the drive begins to run away. If this happens:
 - a) Immediately operate drive STOP and turn off all power
 - b) Reverse the tach connections to reverse feedback.
 - c) Turn on the power again and repeat set up procedure
11. Once controlled operation is observed:
 - a) Increase speed setpoint slowly to full taking care to ensure that the motor does not overspeed by measuring armature volts or using a hand tach if available. At no time should the armature voltage exceed the nameplate rating on the motor.
 - b) increase the MAX SPEED pot until the correct full speed operation of the motor is reached. Use a hand tach, or monitor tach volts.

~~10. Operate the drive "STOP" and turn off all power.~~

APPENDIX 5 Factory Available Options

1. Master Setpoint Reference / Voltage Follower

If a reference signal from a single drive is to be distributed to more than three drives, a Master Setpoint Reference card must be used. The card also provides a voltage follower option which allows the drive to follow an external DC voltage up to 100V. Bardac part number SP1070D.

2. Encoder feedback

Encoder or Ring-Tach pulse feedback up to 20 kHz can be converted to the necessary linear DC voltage signal using a Bardac frequency to voltage converter. Bardac part number SP1060MP007.

3. AC Tach feedback

The SLE tach input requires a DC voltage reference. If an AC tach is to be used, a AC - DC tach converter must be used. Bardac part number 500202.

4. Winder Card

The model 430D Constant Tension Center Winder is designed to give open loop control of web tension in center winding applications. The unit features digital diameter calculation, inertia and friction compensation, as well as taper tension to help prevent telescoping and core crushing.

5. PID

The SP1070PID PID controller can provide speed or tension control when used with a feedback device such as a loadcell or dancer. Consult factory for more details.

6. Dynamic Braking Option

If dynamic braking is required a ~~60000~~ Dynamic Braking option kit must be installed. This will ensure the correct control sequencing the DB contactor. Contact the factory for the appropriate dynamic braking option.

7. Detector Card

The SP1090D Detector Card is a two channel voltage level comparator. Two C-Face relays can provide contact closures for up-to-speed, overspeed, and other level comparison functions.

8. Digital Panel Meter

The DPM35 series digital panel meters can be utilized to display any of the isolated drive outputs. The display can be scaled to display absolute terms (0 - 10 V output displayed directly) or scaled for user unit (0 - 10V is displayed as 0 - 1750 or 0 - 100 etc.) Unit can operate on either 120 or 240 VAC.

Bardac part numbers: DPM35S (3 1/2 digit)
 DPM35SD (4 digit)

APPENDIX 6 Customer Services & Sales

Customer Information Services

It is our policy to give customers all the help they need to apply and service their equipment.

Detail information about the design and specification of all the drives and control modules is available from a comprehensive set of manuals, product guides and application notes. We do not encourage component level field repairs as, in our experience, the absence of specialized tools and test equipment makes this impractical and not cost effective. We do, however, think that a deep working knowledge of the equipment helps ensure successful application and use of the products and therefore we encourage system designers and users to acquire a complete set of the following documentation:

- Product Installation and Maintenance Manuals
- Application Reference Manuals
- Product test specifications
- Test set design recommendations
- User training programs and manuals

Telephone Support

Never hesitate to call us if you need help or are in any doubt about the functioning of your drives. We will always be pleased to discuss your drive problem and we may be able to save you a lot of time and unnecessary expense!

We do not charge for this service!

Start-up, Training, Service and Customer Support

The Bardac-Sprint Electric International Service Network is a group of organizations dedicated to providing the highest standard of support to our drives and systems users worldwide. The Network is constantly growing and includes facilities throughout the USA, Europe and Australia.

In the USA

Alabama ... Arkansas ... California ... Florida ... Georgia ... Illinois ... Indiana ... Kansas ... Maryland ... Massachusetts ... Minnesota ... Missouri ... Montana ... New Jersey ... North Carolina ... Ohio ... Oklahoma ... Oregon ... Pennsylvania ... South Carolina ... Texas ... Virginia ... Washington ... Wisconsin

International

Australia ... Belgium ... Canada ... France ... Germany ... Great Britain ... Hong Kong ... Israel ... Korea ... New Zealand ... Sweden ... Switzerland

For Service Worldwide ... call 410-604-3400

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