AC TECH SMV Series

ELECTRICAL INSTALLATION

&

OPERATION MANUAL

Envira-North SYSTEMS LTD.

All installation wiring must conform to the Canadian Electrical Code and local codes. While we believe that using Envira-North's controls and following our instructions will result in an installation that meets those requirements, we cannot guarantee it. Code compliance is ultimately the installer's and/or user's responsibility.

Subject to changes without notification

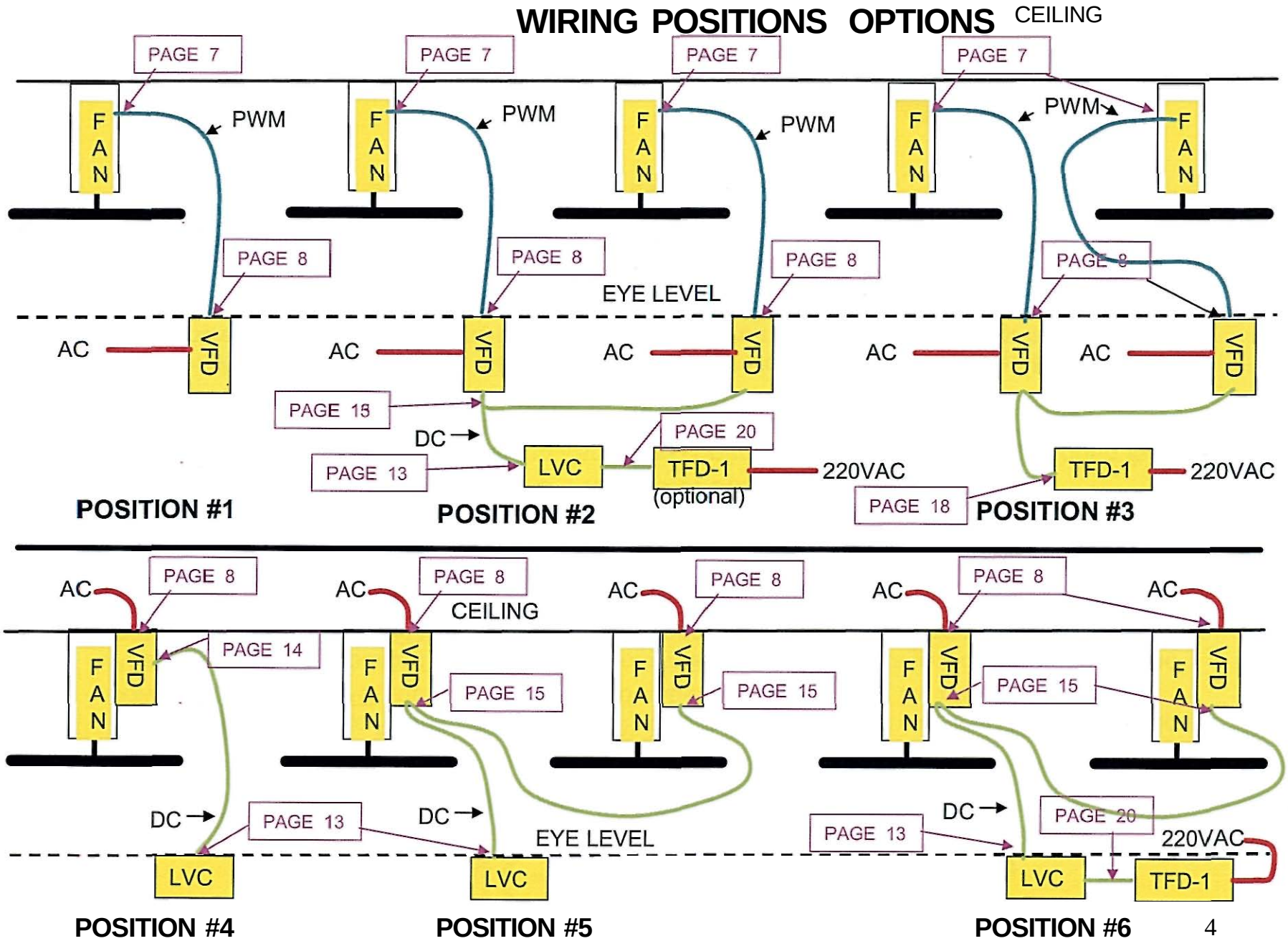
TABLE OF CONTENTS

WIRING POSITIONS

(see following page for diagrams)

- **Position #1** - Variable Frequency Drive (VFD) mounted at eye-level, you need to bring the input power cable to the VFD, then an inverter-rated cable from the VFD to the motor.
- **Position #2** - VFD mounted at eye-level and controlled by a Low Voltage Controller (LVC) (the temperature controller (TFD-1) is optional), you need to bring the input power cable to the VFD, then an inverter-rated cable from the VFD to the motor. A control cable can be daisy-chained between the LVC and the VFDs.
- **Position #3** - VFD mounted at eye-level and controlled by a TFD-1, you need to bring the input power cable to the VFD, then an inverter-rated cable from the VFD to the motor. A control cable can be daisy-chained between the TFD-1 and the VFDs.
- **Position #4** - VFD mounted on the fan frame and controlled by a LVC, you need to bring the input power cable to the VFD, the inverter-rated cable from the VFD to the motor is pre-wired. A control cable is needed between the LVC and the VFD.
- **Position #5** - VFD mounted on the fan frame and controlled by a LVC, you need to bring the input power cable to the VFD, the inverter-rated cable from the VFD to the motor is pre-wired. A control cable can be daisy-chained between the LVC and the VFDs.
- **Position #6** - VFD mounted on the fan frame and controlled by a LVC and a Temperature Controller, you need to bring the input power cable to the VFD, the inverter-rated cable from the VFD to the motor is pre-wired. A control cable can be daisy-chained between the LVC and the VFDs. A control cable is needed between the LVC and TFD-1.

WIRING POSITIONS OPTIONS

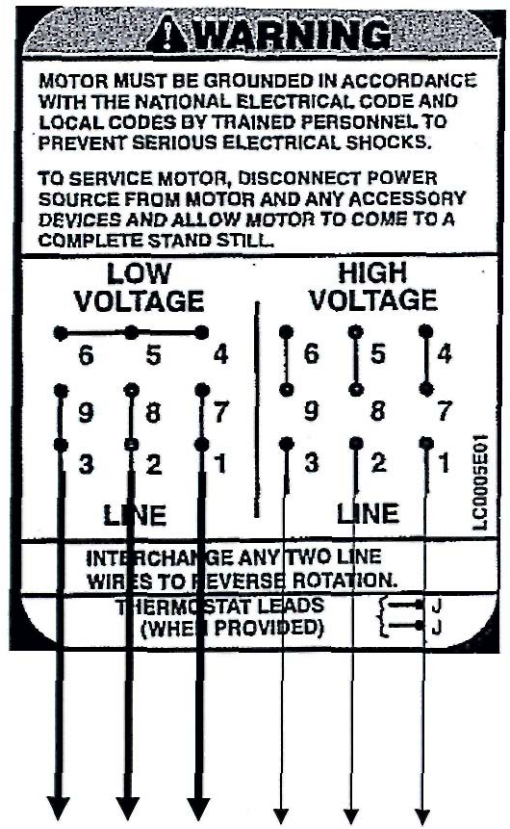


WIRE TYPE

- The wires/cable between the Variable Frequency Drive (VFD) and the motor must be the inverter-duty type, if a shielded cable is used. The shielded cable should be a minimum 4 x 1 4 AWG (3 phase wires + insulated ground).
- Recommended cables: Belden 29501 (14AWG) or 29502 (12AWG) or Alpha Wire V16014 (14AWG) or V16012 (12AWG)
- If EMT conduit is used, then the proper wire rating must be used. 14 AWG minimum x 4 (3 phase wires + insulated ground). Proper bonding is required.
- For control wires use 18AWG shielded cable.

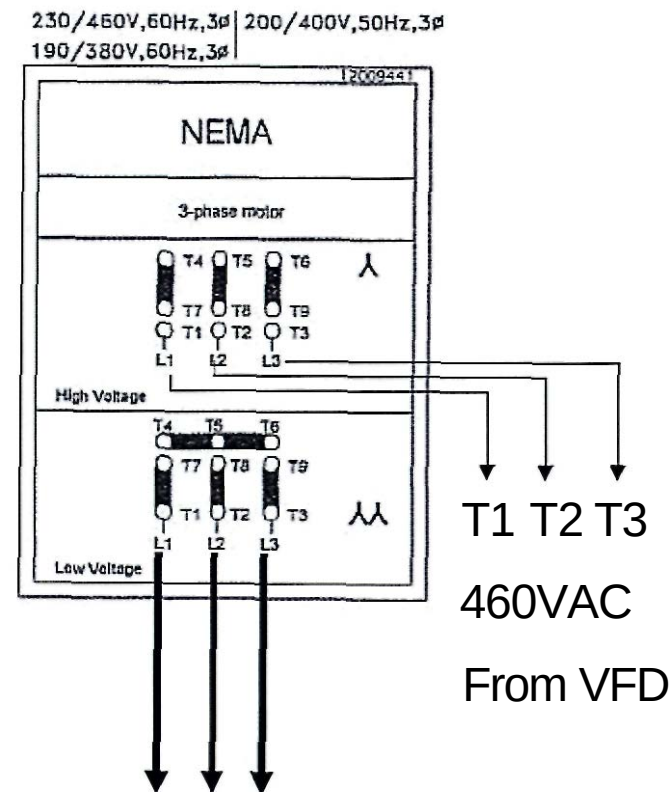
Separate conduits for input and output power; also use a separate conduit for control cable

	MAX 3% VOLTAGE DROP - CEC 2002					MAX RECOMMENDED DISTANCE in ft								
3Ø 208V	#14	#12	#10	#8	3Ø 460V	#14	#12	#10	#8	3Ø 600V	#14	#12	#10	#8
Amps					Amps					Amps				
1	1047.0	1664	2646	4211	1	2416	3840	6107	9717	1	3020	4800	7634	12146
2	523.50	832.00	1323.00	2105.50	2	1208.00	1920.00	3053.50	4858.50	2	1510.00	2400.00	3817.00	6073.00
3	349.00	554.67	882.00	1403.67	3	805.33	1280.00	2035.67	3239.00	3	1006.67	1600.00	2544.67	4048.67
4	261.75	416.00	661.50	1052.75	4	604.00	960.00	1526.75	2429.25	4	755.00	1200.00	1908.50	3036.50
5	209.40	332.80	529.20	842.20	5	483.20	768.00	1221.40	1943.40	5	604.00	960.00	1526.80	2429.20
6	174.50	277.33	441.00	701.83	6	402.67	640.00	1017.83	1619.50	6	503.33	800.00	1272.33	2024.33
7	149.57	237.71	378.00	601.57	7	345.14	548.57	872.43	1388.14	7	431.43	685.71	1090.57	1735.14
8	130.88	208.00	330.75	526.38	8	302.00	480.00	763.38	1214.63	8	377.50	600.00	954.25	1518.25
9	116.33	184.89	294.00	467.89	9	268.44	426.67	678.56	1079.67	9	335.56	533.33	848.22	1349.56
10	104.70	166.40	264.60	421.10	10	241.60	384.00	610.70	971.70	10	302.00	480.00	763.40	1214.60
11	95.18	151.27	240.55	382.82	11	219.64	349.09	555.18	883.36	11	274.55	436.36	694.00	1104.18
12	87.25	138.67	220.50	350.92	12	201.33	320.00	508.92	809.75	12	251.67	400.00	636.17	1012.17
13	80.54	128.00	203.54	323.92	13	185.85	295.38	469.77	747.46	13	232.31	369.23	587.23	934.31
14	74.79	118.86	189.00	300.79	14	172.57	274.29	436.21	694.07	14	215.71	342.86	545.29	867.57
15	69.80	110.93	176.40	280.73	15	161.07	256.00	407.13	647.80	15	201.33	320.00	508.93	809.73
16	65.44	104.00	165.38	263.19	16	151.00	240.00	381.69	607.31	16	188.75	300.00	477.13	759.13
17	61.59	97.88	155.65	247.71	17	142.12	225.88	359.24	571.59	17	177.65	282.35	449.06	714.47
18	58.17	92.44	147.00	233.94	18	134.22	213.33	339.28	539.83	18	167.78	266.67	424.11	674.78
19	55.11	87.58	139.26	221.63	19	127.16	202.11	321.42	511.42	19	158.95	252.63	401.79	639.26
20	52.35	83.20	132.30	210.55	20	120.80	192.00	305.35	485.85	20	151.00	240.00	381.70	607.30
21	49.86	79.24	126.00	200.52	21	115.05	182.86	290.81	462.71	21	143.81	228.57	363.52	578.38
22	47.59	75.64	120.27	191.41	22	109.82	174.55	277.59	441.68	22	137.27	218.18	347.00	552.09
23	45.52	72.35	115.04	183.09	23	105.04	166.96	265.52	422.48	23	131.30	208.70	331.91	528.09
24	43.63	69.33	110.25	175.46	24	100.67	160.00	254.46	404.88	24	125.83	200.00	318.08	506.08
25	41.88	66.56	105.84	168.44	25	96.64	153.60	244.28	388.68	25	120.80	192.00	305.36	485.84
26	40.27	64.00	101.77	161.96	26	92.92	147.69	234.88	373.73	26	116.15	184.62	293.62	467.15



From VFD T3 T2 T1 T3 T2 T1

230VAC 460VAC



From VFD T1 T2 T3

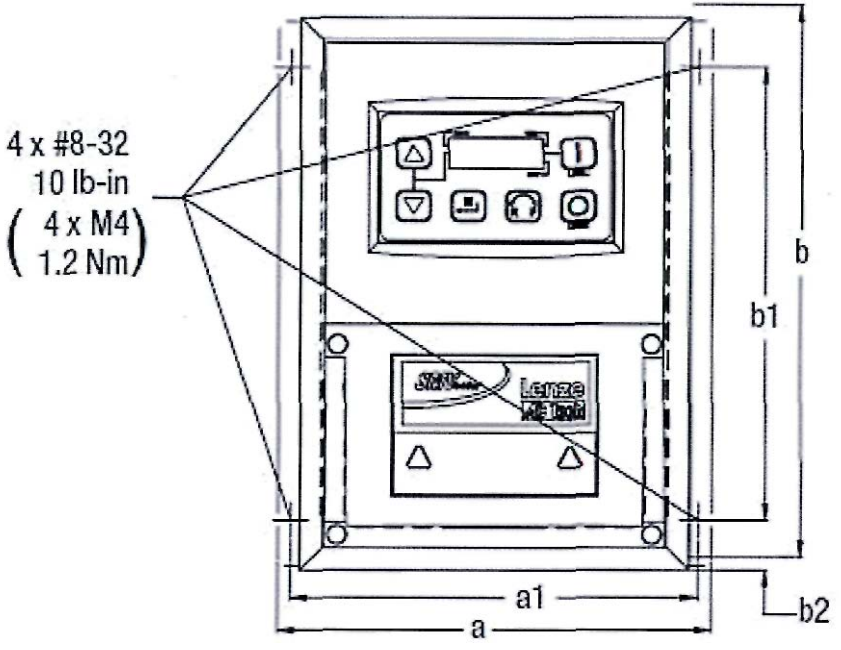
460VAC

From VFD T1 T2 T3

230VAC

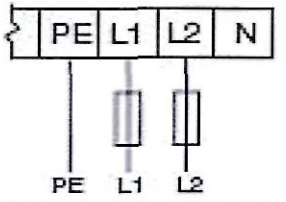
DIMENSION

Type	a in (mm)	a1 in (mm)	b in (mm)	b1 in (mm)	b2 in (mm)	Depth c in (mm)
ESV152N04TXC	6.28 (160)	5.90 (150)	8.00 (203)	6.56 (167)	0.72 (18)	6.27 (159)

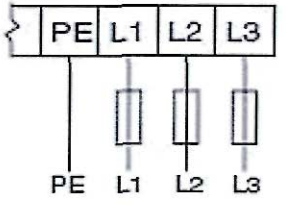


CONNECTIONS

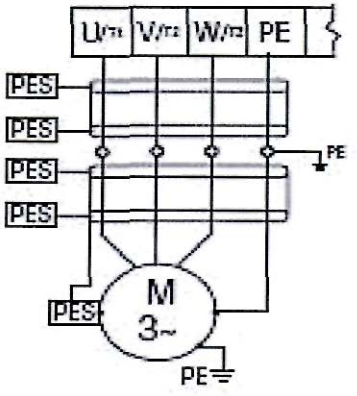
SINGLE PHASE 240VAC SUPPLY



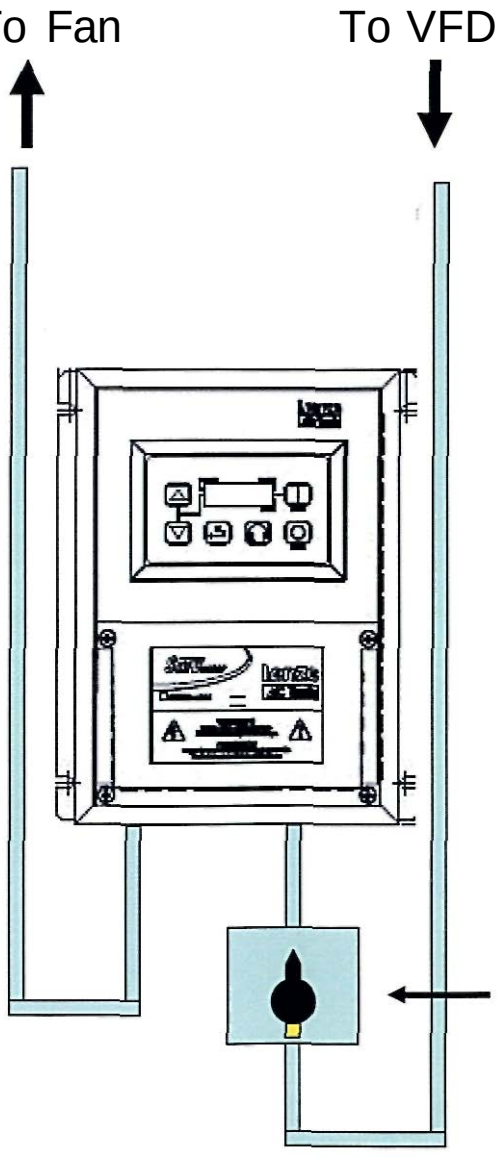
THREE PHASE SUPPLY



MOTOR CONNECTIONS



PES = Protective Earth Shielding

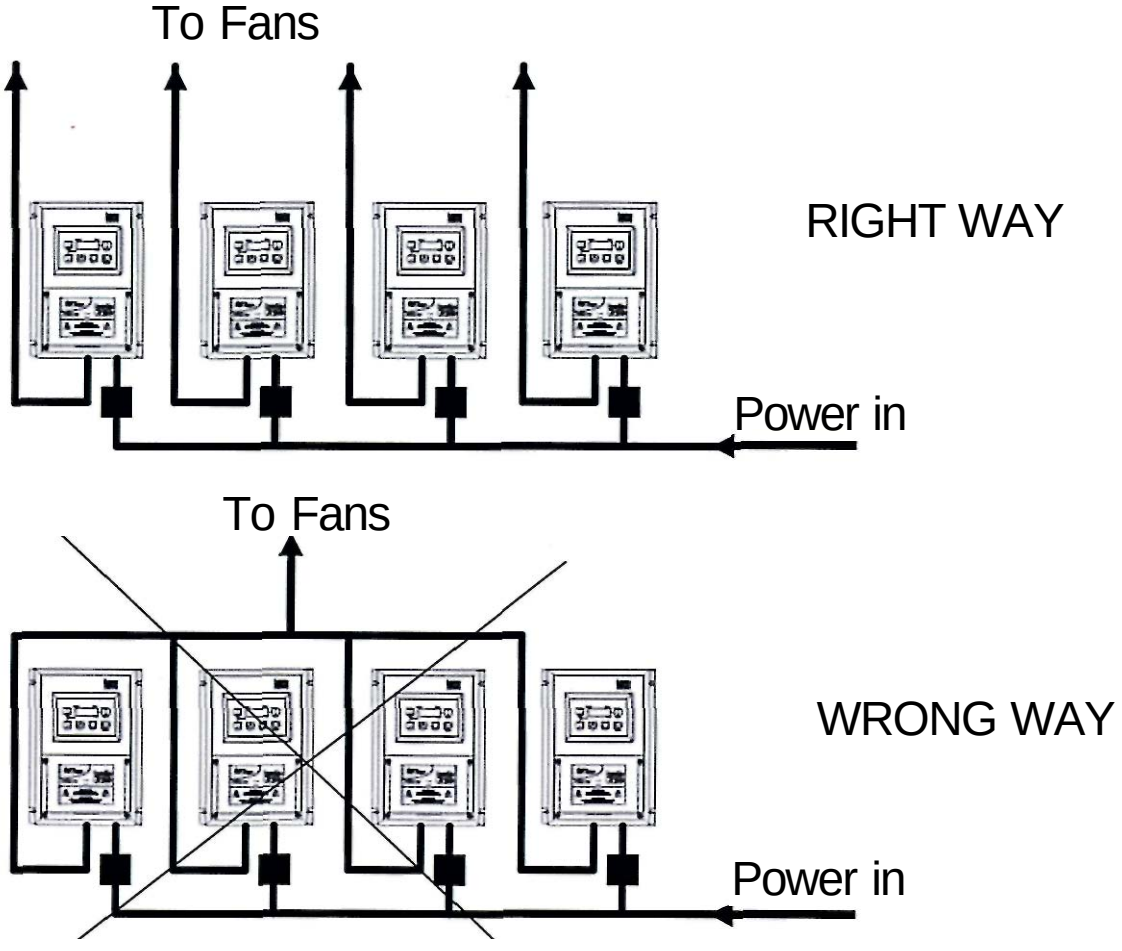


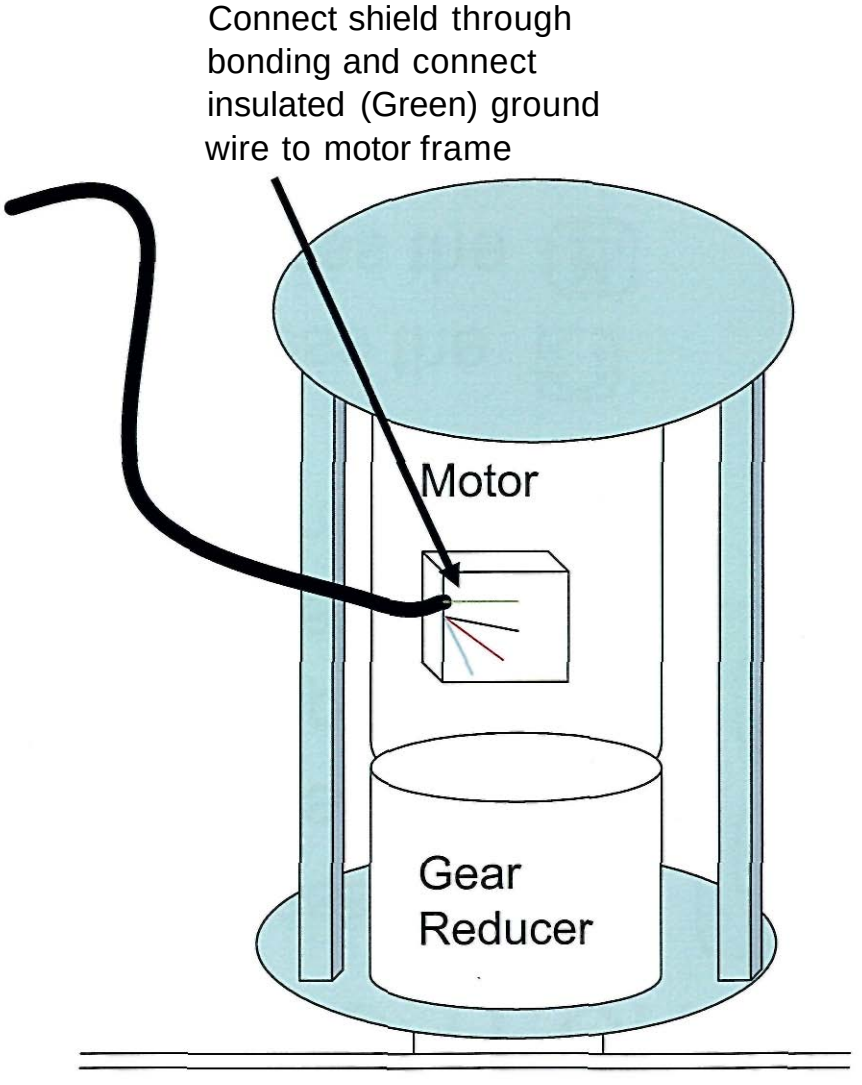
IMPORTANT:

Input and output cables must be in different EMT conduits.

The output power cable to the fan must **NOT** be in a conduit with other cables.

ESV152N04TXC




Connect shield through bonding and connect insulated (Green) ground wire to motor frame
Motor
Gear Reducer

OPERATION INSTRUCTIONS for the AC TECH SMV

To start: Press the 

To stop: Press the 

To change speed:

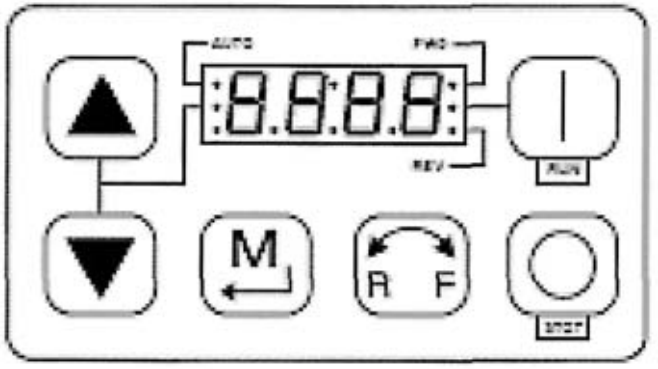
Press the 

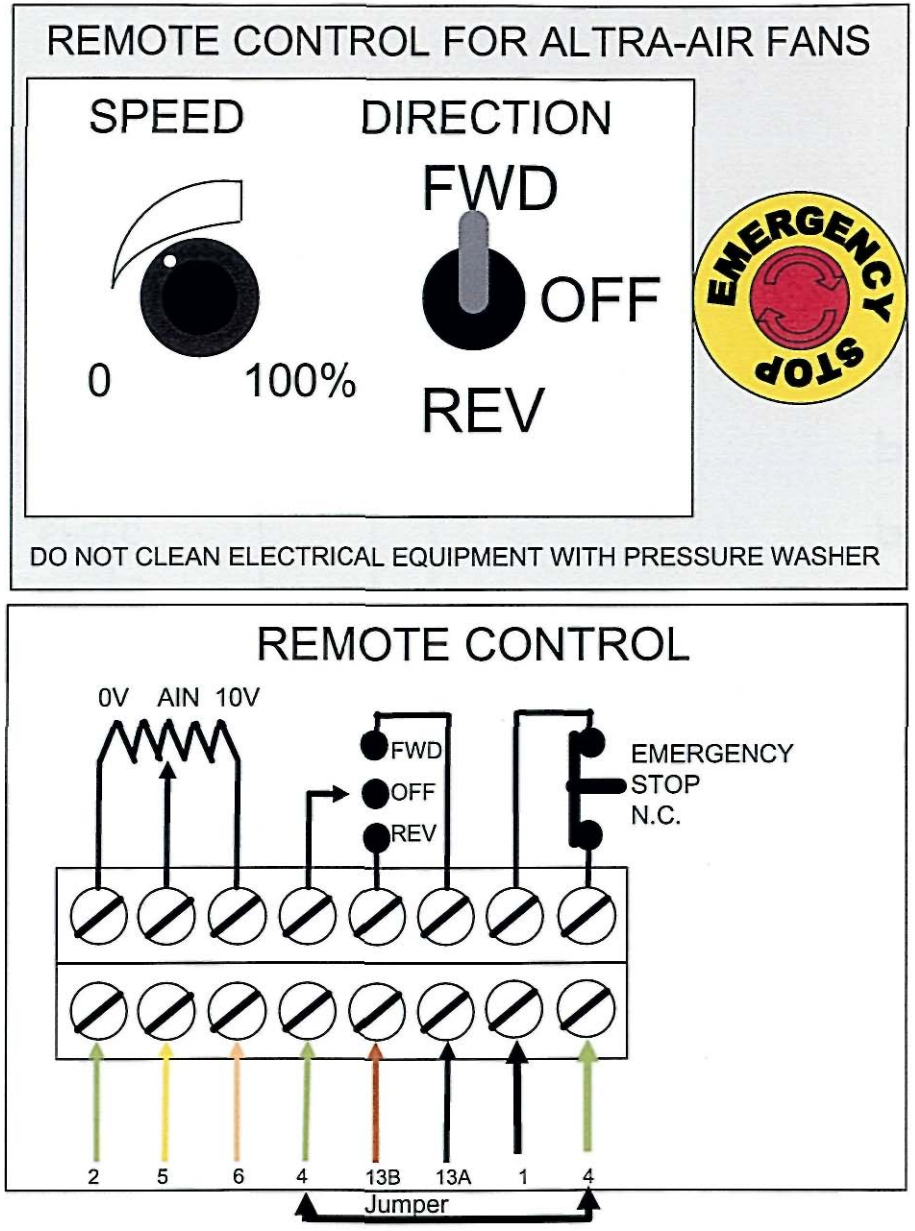
To change the rotation:

Press the 

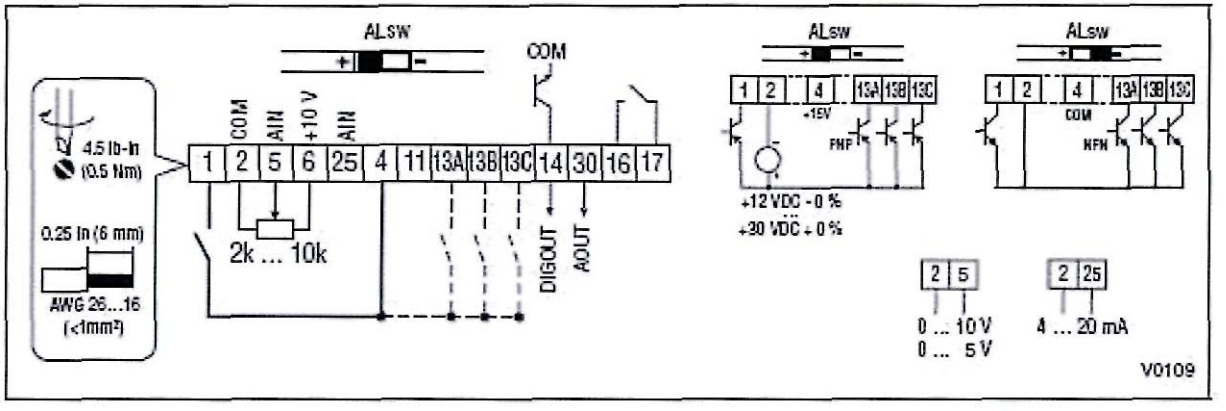
Then press the 

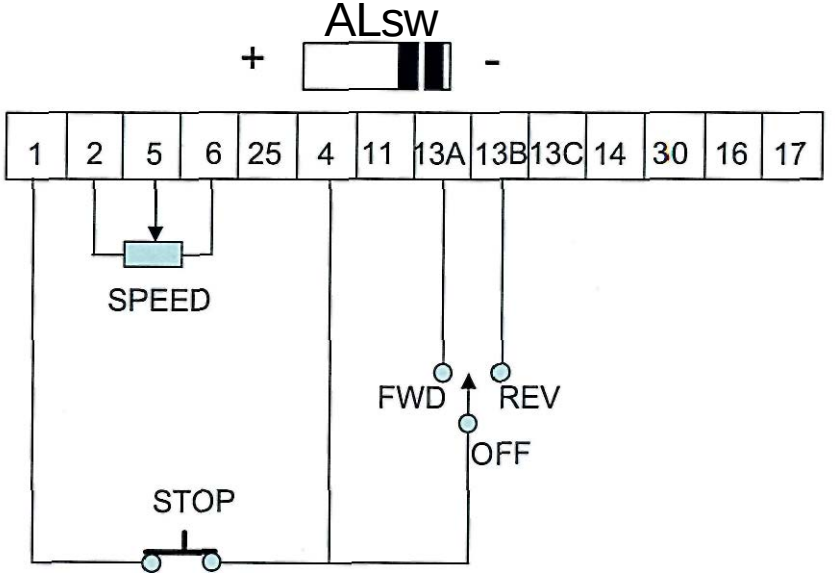
within 4 seconds to confirm the change





To remote AC TECH SMV Series





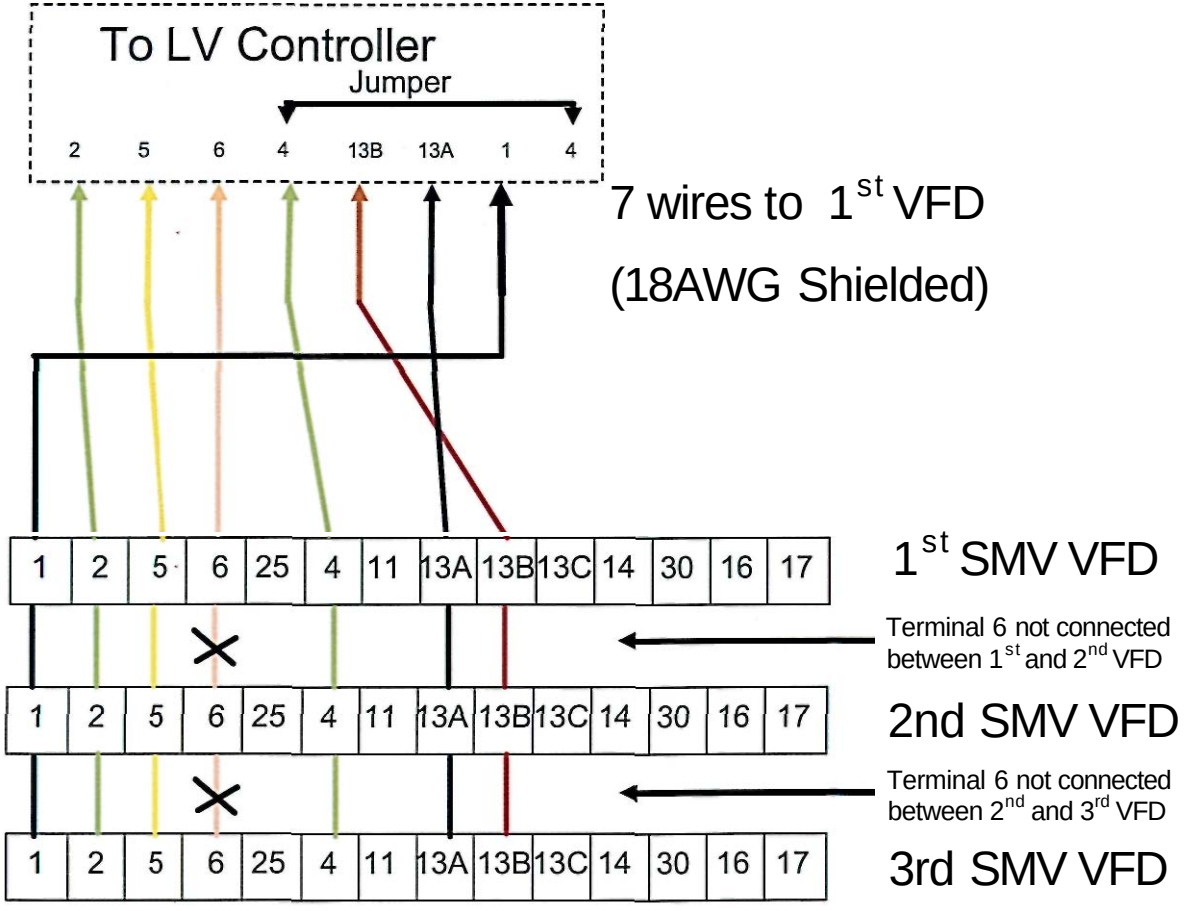
P101 -1 0-10VDC

P120-1 LOW AL

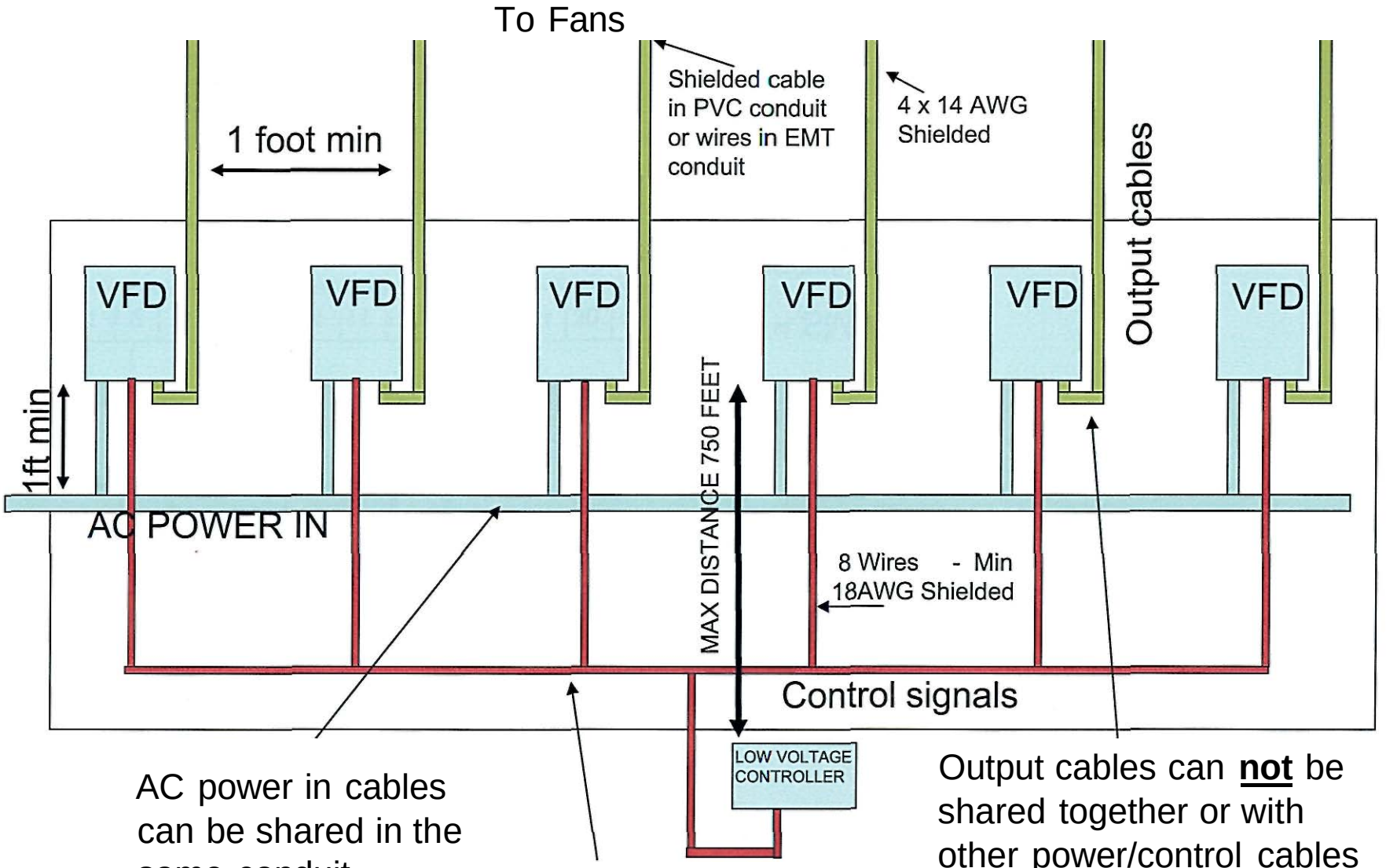
P121 -13 RUN FWD

P122-14 RUN REV

To remote AC TECH SMV Series



2008040701SGG To remote AC TECH SMV Series



AC power in cables can be shared in the same conduit

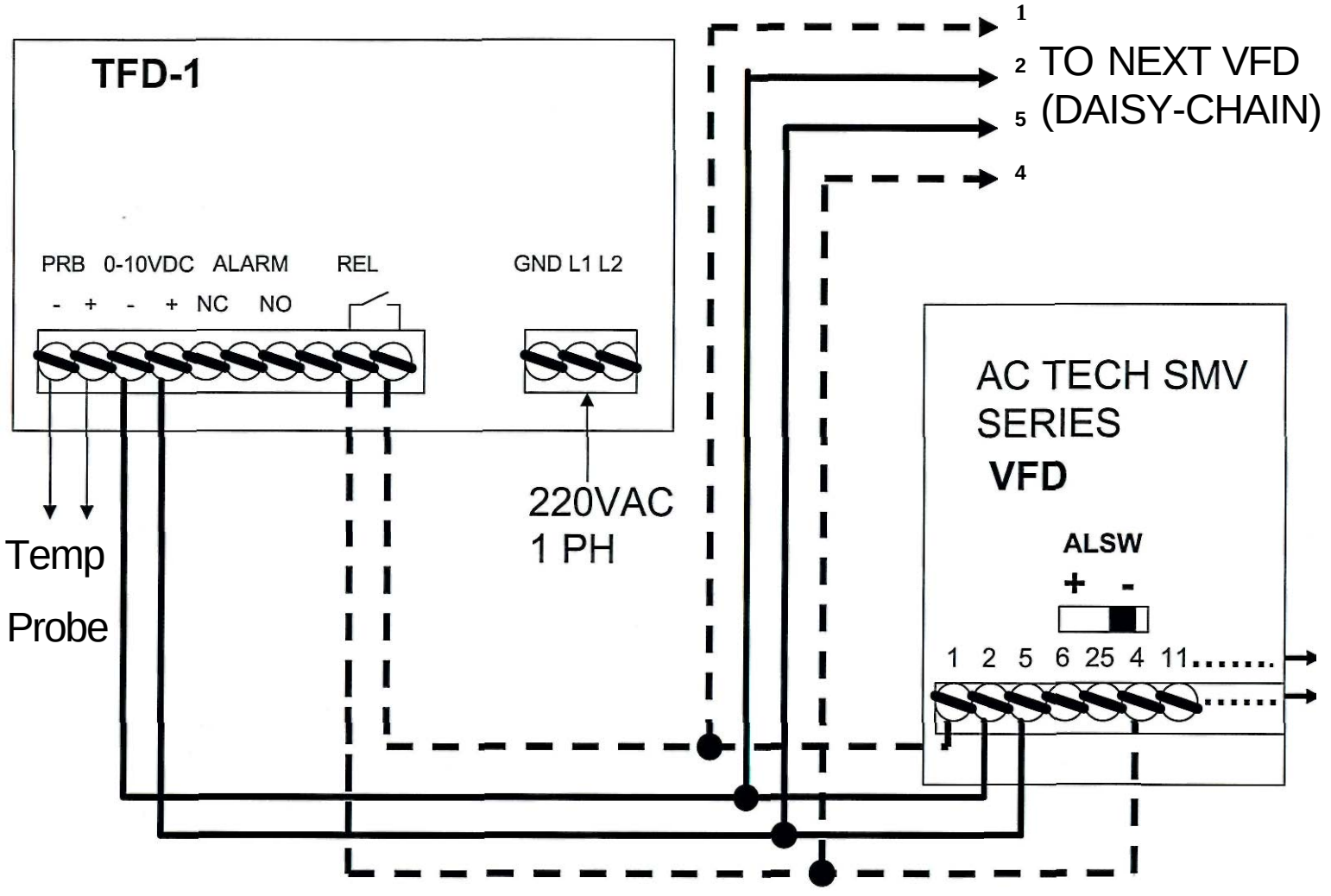
Control cables can be shared together but **not** with power cables

Output cables can **not** be shared together or with other power/control cables

2007112302SGG

OPERATION INSTRUCTIONS of the Low Voltage Controller

- **TO START THE FAN:**
- Before turning on disconnect switch, verify that the direction switch is in the "OFF" position and the emergency stop in pushed in.
- Apply power by turning on the disconnect switch.
- To put the fan in operation, select the desired direction and then release the emergency switch by turning it clockwise.
- **TO ADJUST THE SPEED:**
- Turn the potentiometer (SPEED) to the desired speed.
- **TO TURN OFF FAN OPERATION:**
- Depress the emergency stop switch
- **TO RESTART FAN OPERATION AFTER DEPRESS EMERGENCY STOP:**
- Release the emergency switch by turning it clockwise.



20090529 CONNECTIONS BETWEEN TFD-1 AND MULTIPLES SMV VFDs (No LV Controller)

OPERATION OF TFD-1

To reverse or forward the direction of the fan while in motion, change the direction using the "forward/reverse" switch on the SMV VFD. Leave this switch in either position for the fan to operate with the TFD-1 temperature controller.

Setup of TFD-1 Temperature Controller.

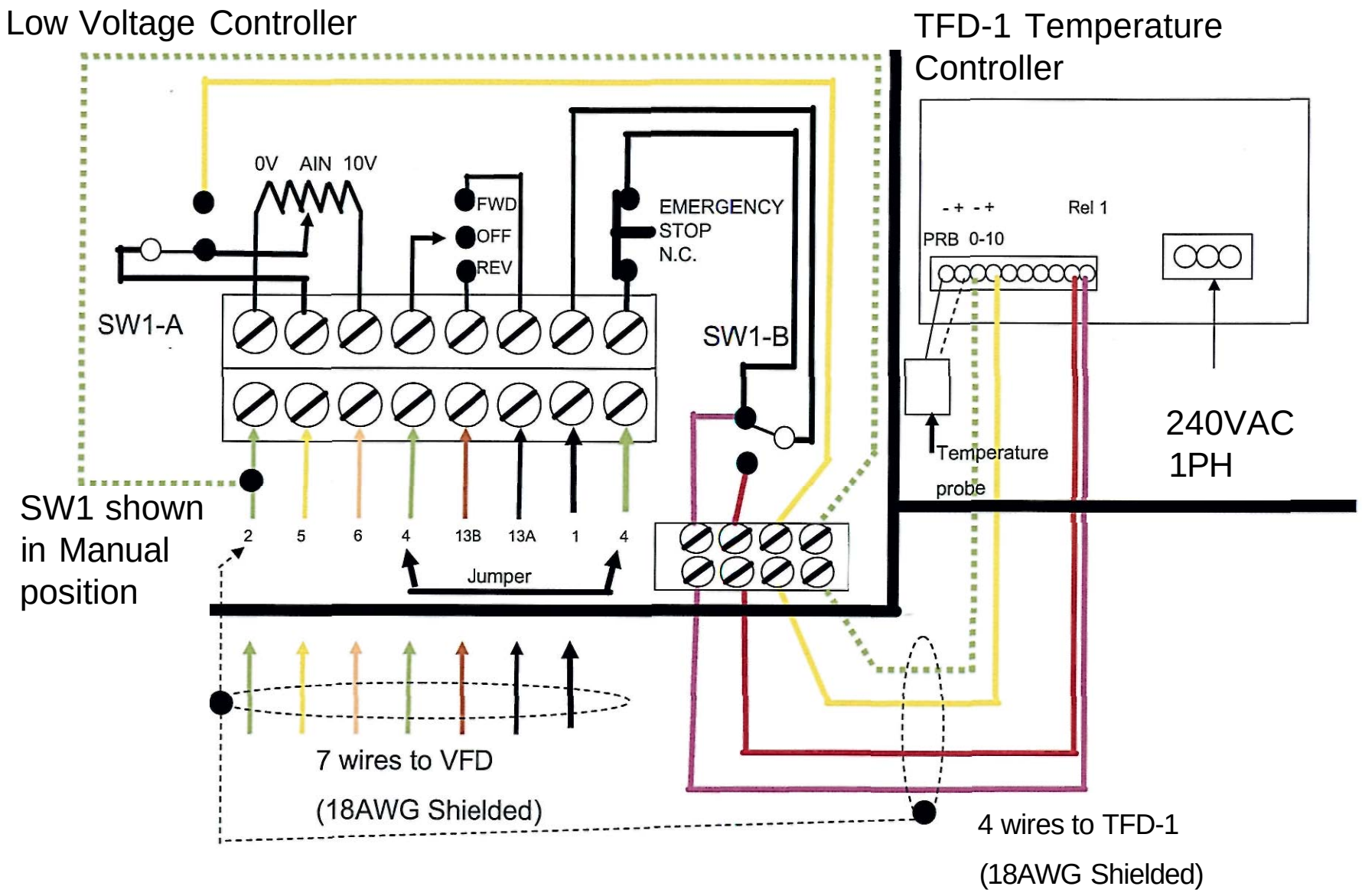
- Rotate Selector dial to position (1) Set point
- Rotate the Adjustor dial to desired set point temperature. Example 20°C
- Rotate Selector dial to position (2) Modulation band
- Rotate the Adjustor dial to desired modulation band. Example 10°C
- Rotate Selector dial to position (3) Minimum ventilation off
- Rotate the Adjustor dial to desired minimum. Example 5°C

Temperature (in Celsius)

- In the example above, from start-up the fan will start to turn only if the barn temperature reaches 20°C. The speed that will be indicated on the fan controller should be approximately 15Hz. As the temperature rises in the barn the fan will increase speed until the temperature reaches the end of the modulation band. At 30°C (set point + modulation band) the fan will be at its maximum (60Hz on the fan controller).
- As the temperature decreases the speed will decrease until you reach the set point (20°C). At that point the speed will be at its minimum (around 15Hz on the fan controller). As the temperature decreases below the set point, the fan will continue to operate at its minimum rate until you reach 15°C (set point minus the minimum ventilation off).
- Below the point of 15°C, the fan will stop and will remain in the off condition until the temperature rises to the set point (20°C) and then the cycle repeats itself.

NOTE:

The minimum speed has been programmed to 15 Hz. **DO NOT lower it pass this limit otherwise your warranty will be void.** Lowering the speed below 15 Hz will cause the motor to overheat because the motor will not draw enough air to cool down at these low speeds.



LVC with TFD-1

OPERATION NOTES ON LOW VOLTAGE CONTROLLER AND TFD-1 TEMPERATURE CONTROLLER

DO NOT TURN OFF THE FAN WHILE IN MOTION USING THE DISCONNECT SWITCH.

- To stop the fan from normal operation, use the forward/off/reverse switch to OFF on the Low Voltage Controller.

  Always use the RED EMERGENCY button (on the right of the Low Voltage Controller) to turn off or stop the fan In case of an emergency.

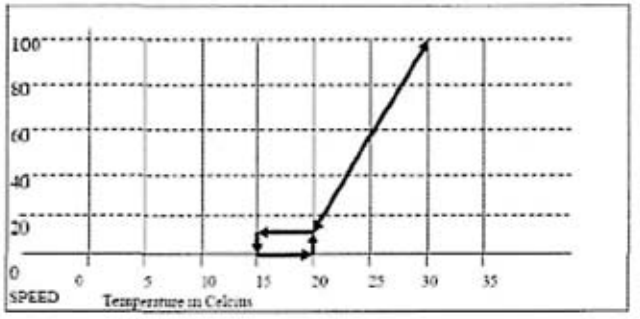
  To reverse or forward the direction of the fan while in motion, change the direction using the "forward/reverse" switch. Leave this switch in either position for the fan to operate with the TFD-1 temperature controller.

  Setup of TFD-1 Temperature Controller.
  - Rotate Selector dial to position (1) Set point
  - Rotate the Adjustor dial to desired set point temperature.
  - Rotate Selector dial to position (2) Modulation band
  - Rotate the Adjustor dial to desired modulation band.
  - Rotate Selector dial to position (3) Minimum ventilation off
  - Rotate the Adjustor dial to desired minimum.

Example 20°C

Example 10°C

Example 5°C



- Temperature (in Celcius)
  - In the example above, from start-up the fan will start to turn only if the interior building temperature reaches 20°C. The speed that will be indicated on the fan controller should be approximately 15Hz. As the temperature rises in the building the fan will increase speed until the temperature reaches the end of the modulation band. At 30°C (set point + modulation band) the fan will be at its maximum (60Hz on the fan controller).
  - As the temperature decreases the speed will decrease until you reach the set point (20°C). At that point the speed will be at its minimum (around 16 on the fan controller). As the temperature decreases below the set point, the fan will continue to operate at its minimum rate until you reach 15°C (set point minus the minimum ventilation off).
  - Below this point of 15°C the fan will stop and will stay in the off condition until the temperature rises to the set point (20°C) and then the cycle repeats itself.

NOTES:

The minimum speed has been programmed to 15 Hz. **DO NOT lower it pass this limit otherwise your warranty will be void.** Lowering the speed below 15Hz will cause the motor to overheat because the motor will not draw enough air to cool down at these low speeds.