

Variable Frequency Drives

Manufactured By  **Telemecanique**

a brand of  **Schneider
Electric**

Overview, Basic Operation, Setup
Procedure, and Troubleshooting
for Cool School

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What Are We Going to Learn?

- Why do customer want these things?
- Why did we change the brand and model?
- What are the different models, part numbers, etc.?
- How are they supposed to be wired up?
- How do we operate them?
- How do we program them (if necessary)?
- How do we troubleshoot them if they don't seem to be working?

Why Do Customer Want These?



- Allows for full-torque startups with a controlled current and speed ramp.
- Prevents “dimming the lights” and overloading the generator.
- Runs any 3-phase 50Hz or 60Hz compressor with 50Hz or 60Hz, single or three-phase power supply (can be mixed).

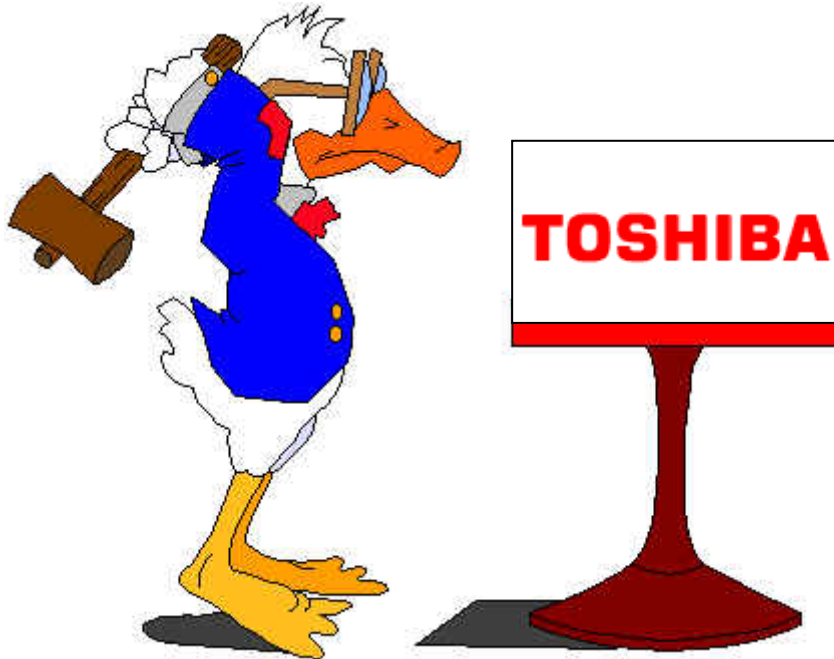
And the number one reason...

Why Do Customer Want These?

- ...The chiller makes a cool sound when starting up!



Why Did We Change?



- In April 2004, Square D informed us that the Altivar 28 was being discontinued. They gave us about 6 weeks to switch over to the Telemecanique Altivar 31.
- In May 2004, Toshiba informed us that the VF-S9 was being discontinued. They gave us about 6 hours (not exactly, but close!) to switch over to the VF-S11 (which is identical to Altivar 31).
- We wanted to merge to one brand of VFD for both Cruisair and Marine Air, so we seized the opportunity. Square D has always provided us the best support and value.

Needless to say, we chose Square D/Telemecanique as the common platform and supplier!

Marine Air Models and Part Numbers

Dometic P/N	Description	Telemecanique Model #
263250104	5HP, 230VAC, 17.5A	ATV31HU40M3X
263250105	7.5HP, 230VAC, 27.5A	ATV31HU55M3X
263250106	10HP, 230VAC, 33A	ATV31HU75M3X
263250110	15HP, 230VAC, 54A	ATV31HD11M3X
263250111	20HP, 230VAC, 66A	ATV31HD15M3X
263250108	5HP, 460VAC, 9.5A	ATV31HU40N4
263250112	7.5HP, 460VAC, 14.3A	ATV31HU55N4
263250202	10HP, 460VAC, 17A	ATV31HU75N4
263250109	15HP, 460VAC, 27.7A	ATV31HD11N4
263250201	20HP, 460VAC, 33A	ATV31HD15N4

Note: Compressor voltage must be specified when placing order.

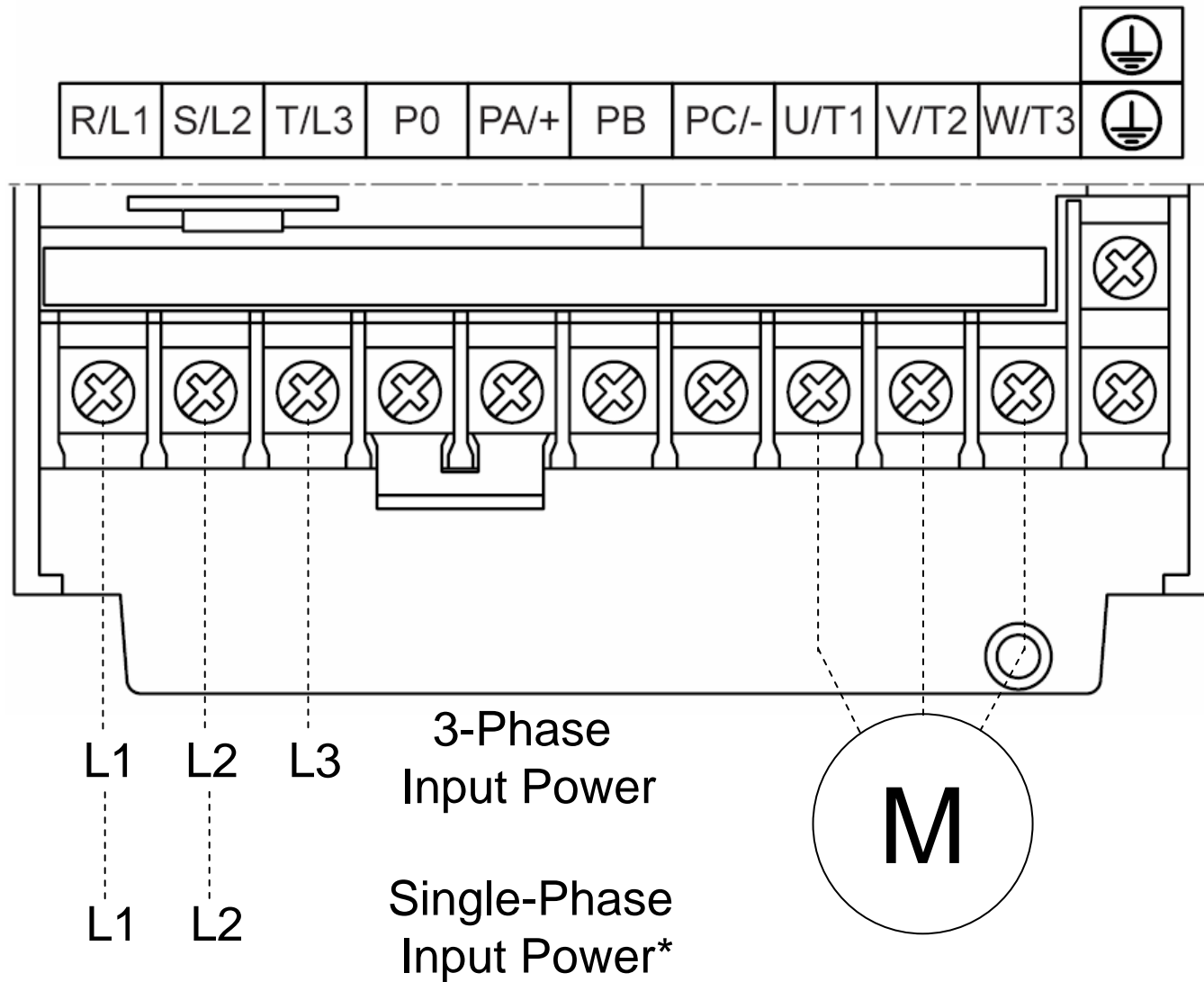
Crusair Models and Part Numbers

Dometic P/N	Description	Telemecanique Model #
763300006	5HP, 230VAC, 17.5A	ATV31HU40M3X
763300007	7.5HP, 230VAC, 27.5A	ATV31HU55M3X
763300008	10HP, 230VAC, 33A	ATV31HU75M3X
763300009	15HP, 230VAC, 54A	ATV31HD11M3X
763300010	20HP, 230VAC, 66A	ATV31HD15M3X
763300011	5HP, 460VAC, 9.5A	ATV31HU40N4
763300012	7.5HP, 460VAC, 14.3A	ATV31HU55N4
763300013	10HP, 460VAC, 17A	ATV31HU75N4
763300016	7.5HP, 380VAC, 14.3A	ATV31HU55N4
763300018	10HP, 380VAC, 17A	ATV31HU75N4
763300019	15HP, 380VAC, 27.7A	ATV31HD11N4

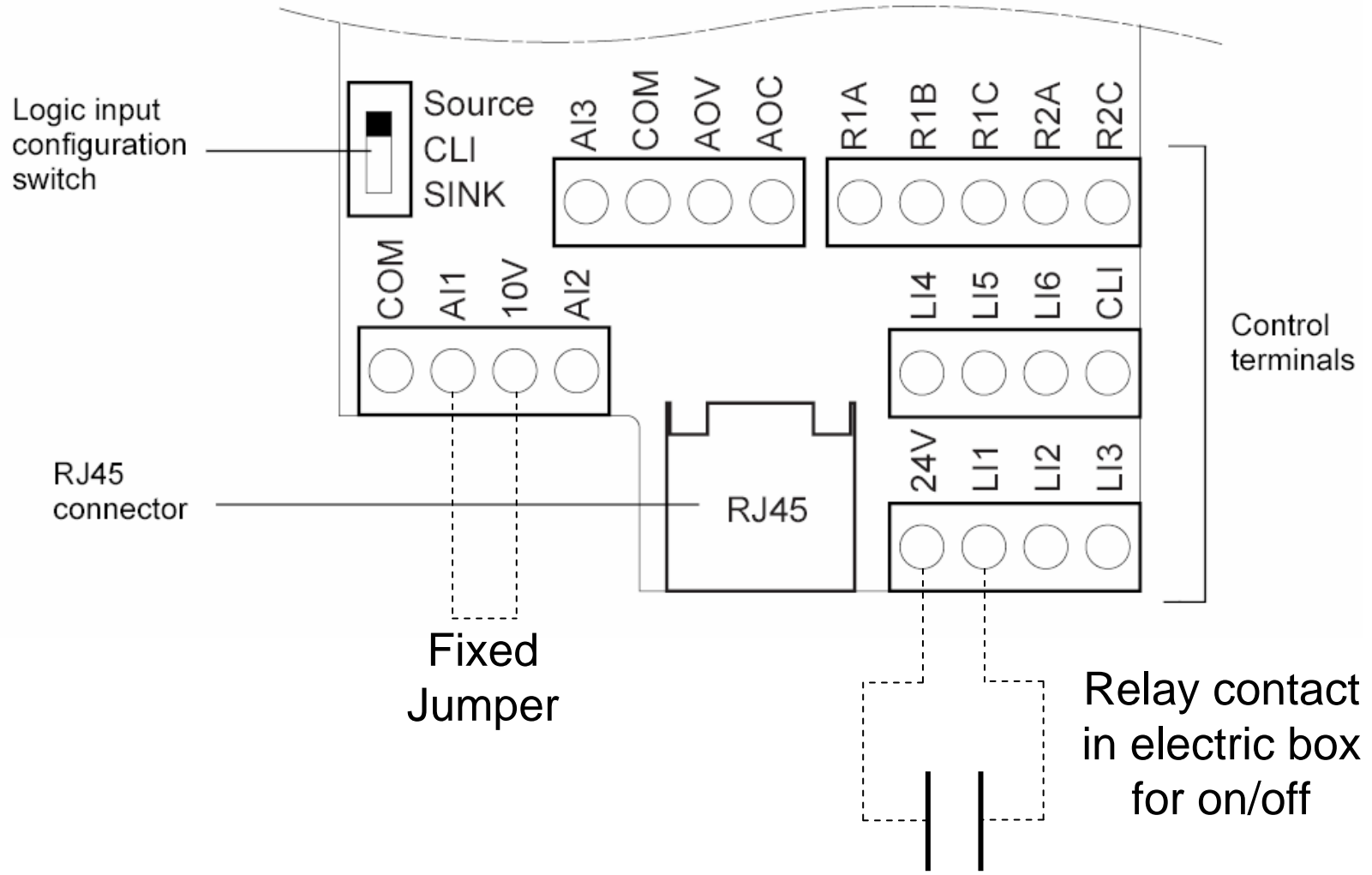
Accessory Part Numbers

Dometic P/N	Description	Telemecanique Model #
5067548	Conduit Box Base for 5HP drives	N/A
5067549	Conduit Box Cover for 5HP drives	N/A
5067530	Conduit Box Base for 7.5-10HP drives	N/A
5067531	Conduit Box Cover for 7.5-10HP drives	N/A
4250203	Conduit Box Kit for 15-12HP drives	VW3A31817
763300002	RFI Filter for 230/460V 5HP drives	VW3A3406
763300003	RFI Filter for 230/460V 7.5-10HP drives	VW3A3407
763300004	RFI Filter for 230V 15-20HP drives	VW3A3408
763300005	RFI Filter for 460V 15-20HP drives	VW3A3409

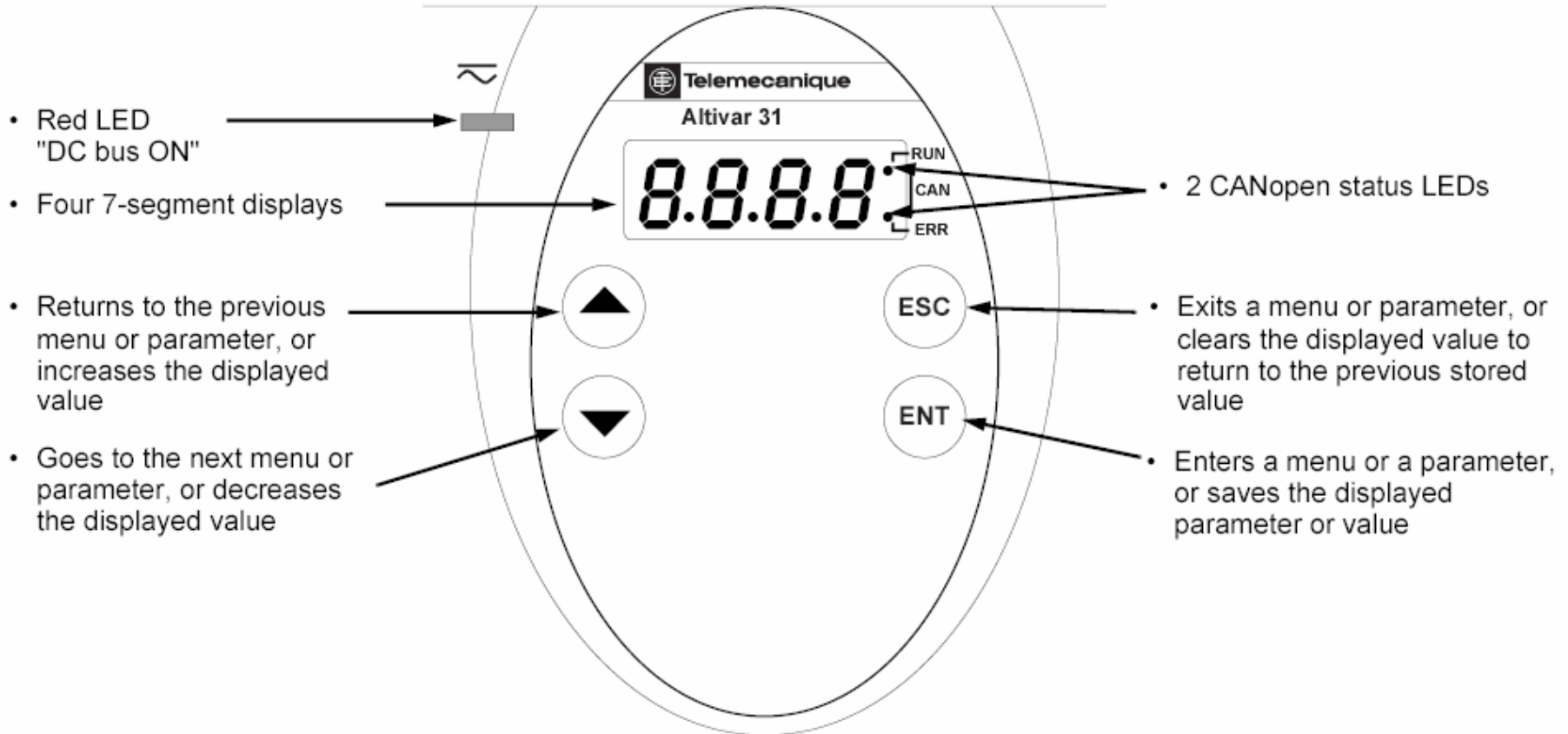
AC Electrical Connections



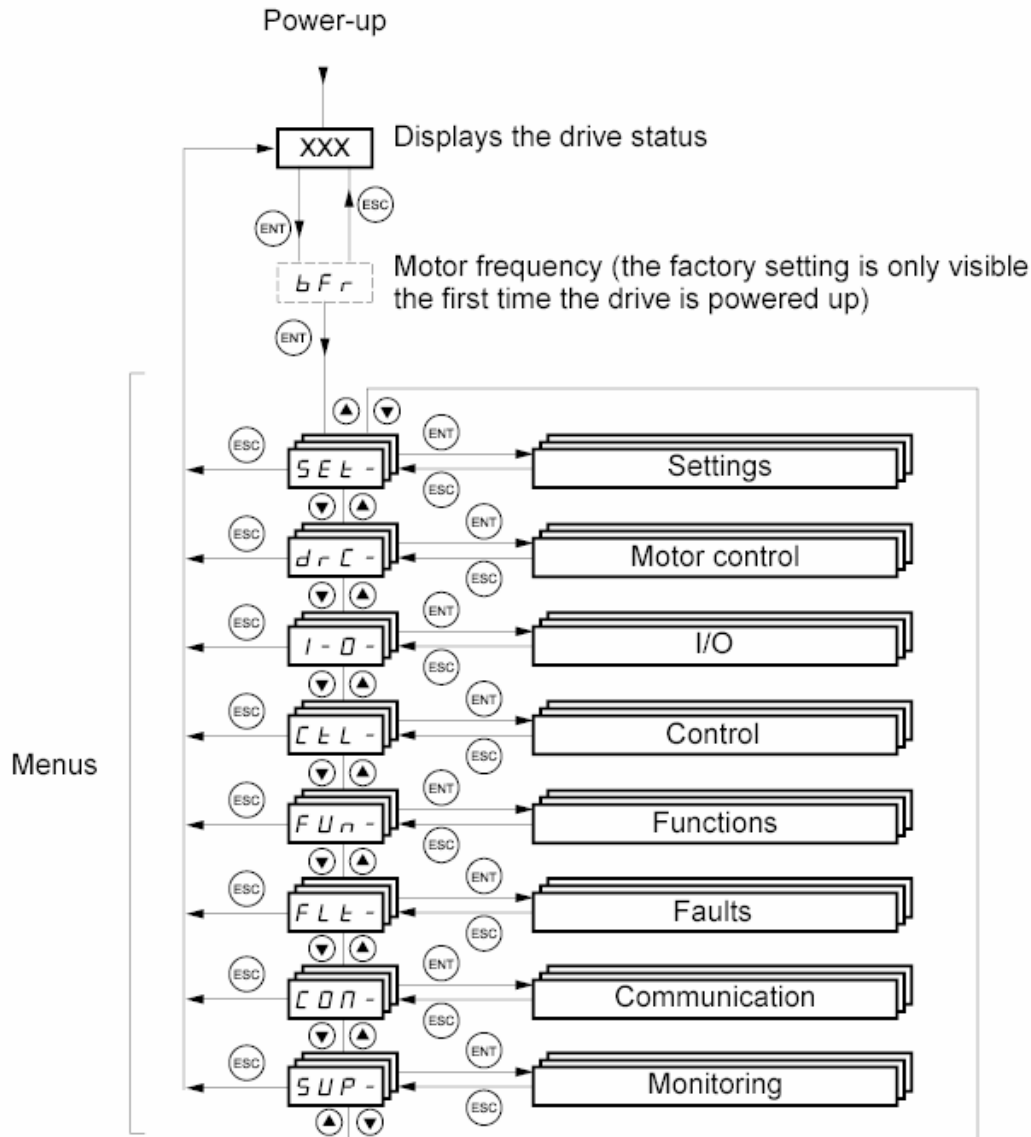
Low Voltage DC Connections



Operator Interface



Programming Menu Structure



- All the programming parameters are setup in a hierarchy.
- The programming procedure navigates you up and down through this scheme in order to visit all the required parameters.
- **All drives come programmed from the factory. Therefore, we recommend that you do not reprogram the drive unless advised to do so by a Dometic service representative!**

Dometic Factory Setup Procedure

Variable Frequency Drive Telemecanique Altivar 31 Programming Procedure (revised 8/06)

- Apply power to the VFD, press ENT, **SEt** is displayed, press ↓, **drC** is displayed, press ENT, **bFr** is displayed, press ↑, **FCS** is displayed, press ENT, **nO** is displayed, press ↓ twice to change to **InI**, press and hold ENT for 3 seconds, display should flash, press ESC twice.
- Press ↑, **SEt** is displayed, press ENT, **ACC** is displayed, press ENT and press ↑ to change to **5**, press ENT, it should flash, press ESC
- Press ↓, **dEC** is displayed, press ENT, press ↑ to change to **5**, press ENT, it should flash, press ESC
- Press ESC, **SEt** is displayed, press ↓, **drC** is displayed, press ENT, **bFr** is displayed, press ENT, press ↓ to change to **60**, press ENT, it should flash, press ESC
- Press ↓, **UnS** is displayed, press ENT, press ↑ to change to <compressor voltage>, press ENT, it should flash, press ESC
- Press ↓, **nCr** is displayed, press ENT, press ↑ or ↓ to change to <compressor FLA in heat>, press ENT, it should flash, press ESC
- Press ESC, **drC** is displayed, press ↓ until **SUP** is displayed, press ENT, **FrH** is displayed, press ↓ to change to **rFr**, press ENT, **0.0** is displayed. Press ENT again and hold for 2 seconds. **0.0** display will flash. Press ESC
- Press ESC, **SUP** is displayed, press ↓ until **FLt** is displayed, press ENT, **Atr** is displayed, press ENT, press ↓ to change to **YES**, press ENT, it should flash, press ESC
- Press ↓, until **IPL** is displayed, press ENT, press ↑ to change to **nO if single-phase power** or **yES if three-phase power**, press ENT, it should flash, press ESC
- Press ESC, **FLt** is displayed, press ↑ until **L_O -** is displayed, press ENT, **tCC** is displayed, press ↓, **tCt** is displayed, press ENT, press ↑, **LEL** is displayed, press ENT, it should flash, press ESC
- Press ESC, **L_O -** is displayed, press ↑ until **drC** is displayed, press ENT, **bFr** is displayed, press ↑ until **SCS** is displayed, press ENT, press down to change to **Str 1**, press and hold ENT until it flashes and displays **nO**, press ESC three times, **rdy** is displayed

Dometic Factory Setup Procedure

Parameter	Description
FCS	Restore Factory Defaults
ACC	Acceleration time = 5 seconds
dEC	Deceleration time = 5 seconds
bFr	Compressor Motor Frequency (50 or 60Hz)
nCr	Compressor Motor FLA (amps)
UnS	Compressor Motor Voltage (208, 230, 380, 460)
rFr	Set display to show output frequency to motor
Atr	Allow automatic restarts after fault clears (only for certain faults)
IPL	Line phase loss/reversal detection (yes for 3 Φ , no for single Φ)
tCt	2-wire operation signal behavior (shorted=on, open=off)
SCS	Save the configuration

VFD Fault Codes

Fault Code	Description
bLF	Brake Sequence
CrF	Capacitor Load Circuit
EEF	EEPROM Fault
InF	Internal Fault
OCF	Overcurrent
SCF	Motor short-circuit
SOF	Overspeed
tnF	Auto-tuning fault
COF	CAnopen fault
EPF	External Fault

Fault Code	Description
LFF	Loss of 4-20mA
ObF	Overvoltage during deceleration
OHF	Drive overheated
OLF	Motor overload
OPF	Motor phase loss
OSF	Overvoltage
PHF	Line phase failure
SLF	Modbus fault
CFF	Configuration fault
USF	Undervoltage

Recovering VFD From a Fault

- Lookup fault in Programming Manual on pages 68-69 to determine the root cause.

- You can get a copy of this manual (PDF) directly from the Telemecanique website:

[http://www.telemecanique.com/85256E54006445AD/all/03D5435F0BD8BDD885256DE500655D15/\\$File/1624589.pdf](http://www.telemecanique.com/85256E54006445AD/all/03D5435F0BD8BDD885256DE500655D15/$File/1624589.pdf)

- Clear the fault on the VFD:

- Some faults will clear automatically once the cause has been removed.
- For all others, turn the power off until the display turns off completely (there will be a short delay).

- Double check all of the parameter settings per the factory setup procedure.
- If you are not sure if the chiller electric box is sending the command to the VFD to start the compressor, you can temporarily connect a jumper between LI1 and +24 on the low-voltage terminal block to see if the compressor will run.

Questions?

