AUTOVAC Industrial
Vacuum & Air Systems

Quick Start Guide

VACUUMIQ™
Intelligent Vacuum Controller
US Patent Pending

Quick Start Guide for Vacuum IQ using the M7000 VFD

OVERVIEW

This guide is to assist in the start up of the M7000 series variable frequency drives. In ***Chapter 1*** the installation of the Variable Frequency Drive will be covered. In ***Chapter 2***, the input power to the package, vacuum motor and pressure transducer connections will be shown. In ***Chapter 3,*** the operation of VFD display will be covered. ***Chapter 4*** will deal with electrical drawings for different package configuration (multiple motors). ***Chapter 5 includes*** factory VFD parameters for different package configurations.
Please take time to review this Guide before proceeding with the installation and testing.

SAFETY FIRST!

DANGER ***LETHAL VOLTAGES ARE PRESENT- Before applying power to the variable frequency drive, ensure that all protective covers are on and all wiring connections are secure. After the power has been turned OFF, wait at least 10 minutes until the charge indicator Extinguishes completely before touching any wiring, circuit boards or components.***

Chapter 1- Installation and Wiring

Installation

- Please review and verify that the inverter was received free of damage and is the correct size for the motor being used.

- To ensure personnel safety and to avoid equipment damage, follow standard precautions and the installation procedures for mounting, wiring, and operating environment.

Wiring

- Be sure to follow all applicable codes in make electrical connections to the motor and input power terminals, as well as the control wiring.
- **Transducer wiring should be run in a separate conduit.**
- **Transducer wiring should be run in a separate trench other than high voltage wire trench if possible. Feedback errors may occur if transducer control wire is run in the same trench with high voltage.**

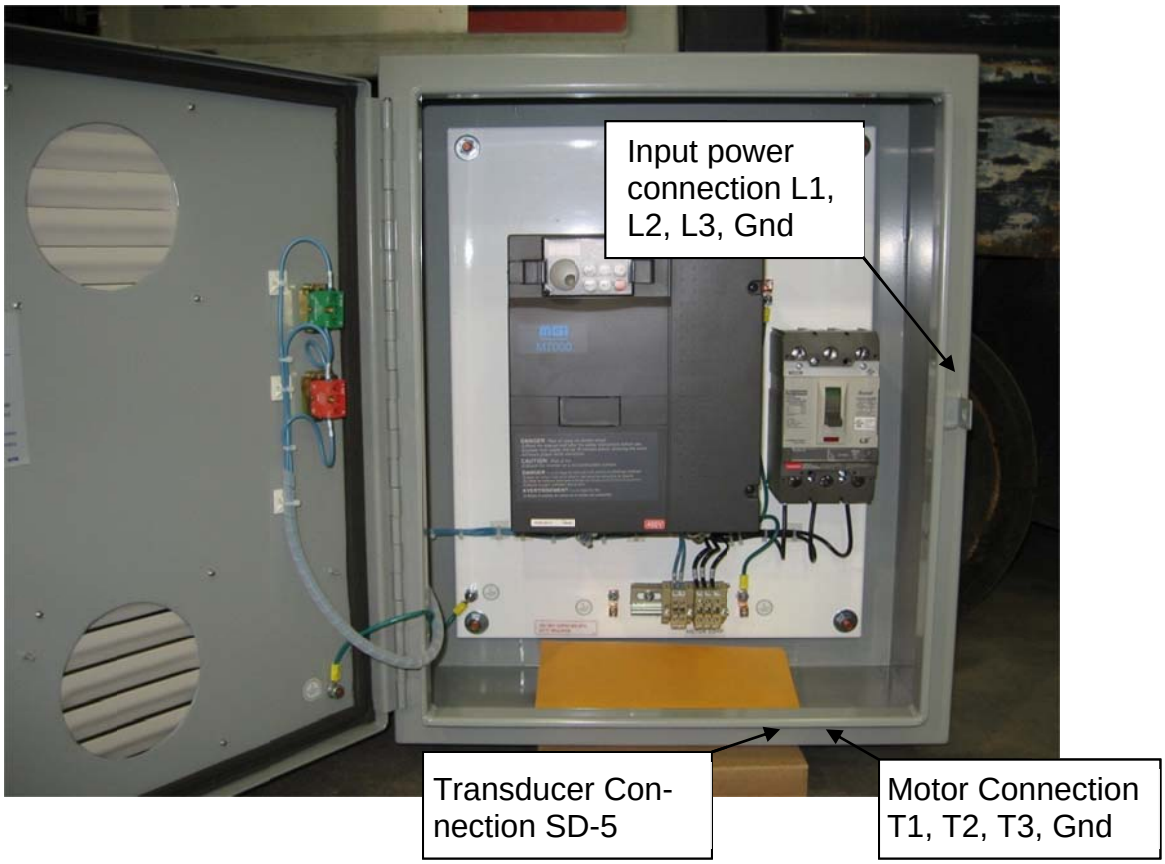
AutoVac cannot be responsible for transducer feedback errors due to control wire being run in the same trench as the high voltage wire.

Chapter 2 – Input Power, Motor and Pressure Transducer connections

With power OFF, ensure the following mechanical and electrical conditions:

- Rated output current of the VFD is equal or greater than the motor FLA.
- Supply voltage, VFD rated voltage and motor voltage match.
- Power factor correction capacitors are **NOT** installed between the VFD and the motor.
- Power factor correction capacitors are **NOT** installed within 100m (300ft) of input to the VFD without a line reactor.
- Motor and the load rotate freely

To connect package to the power supply, motor and pressure transducer please refer to picture below and AutoCad drawings submitted in Chapter 4.



NOTE:

1. For 2 motor configuration, input power and transducer connections are the same. Motor connection terminals are labelled 1T1, 1T2 and 1T3 for the first motor. For second motor terminals are labelled 2T1, 2T2 and 2T32.

2. For 3 motor configuration, input power and transducer connection are the same. Motor connection terminals are labelled 1T1, 1T2 and 1T3 for the first motor. For second motor terminals are labelled 2T1, 2T2 and 2 T32. For third motor terminals are labelled 3T1, 3T2 and 3T3.

CAUTION

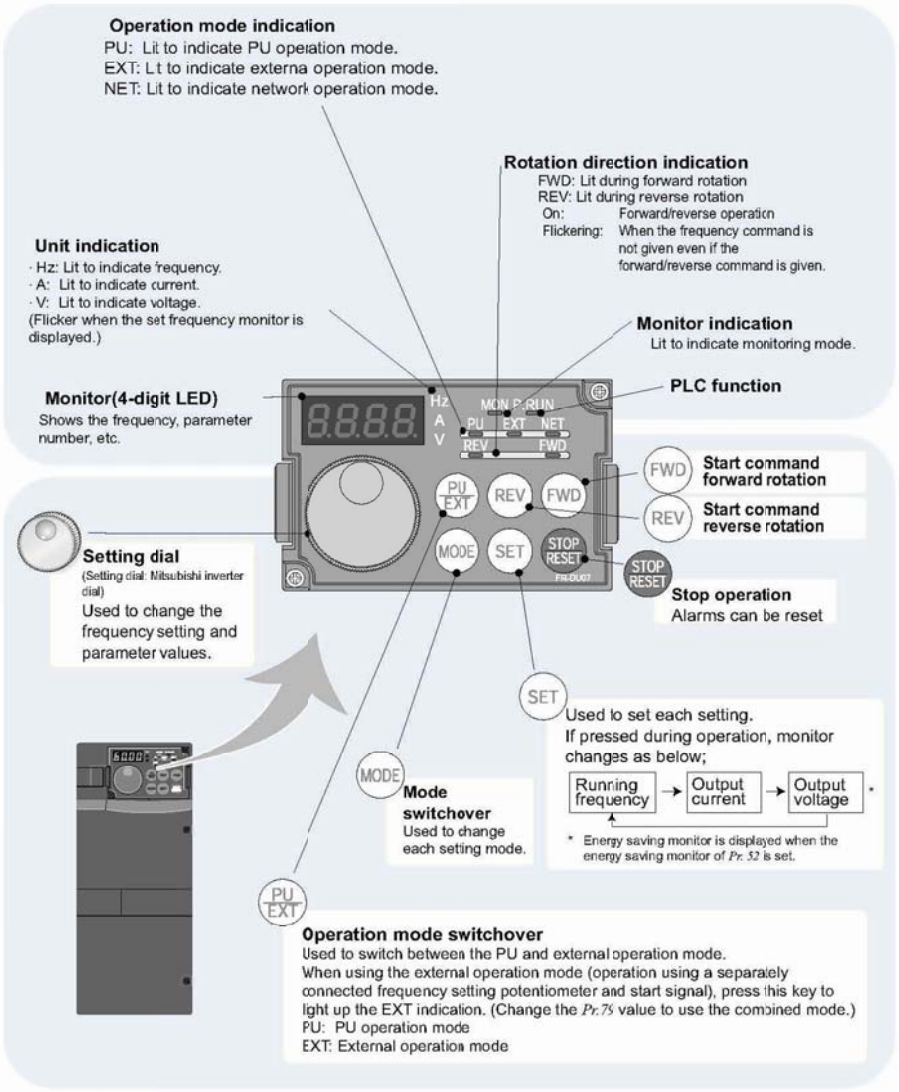
To prevent an electric shock always ground the motor and VFD.
Use independent grounding method for the VFD. If independent grounding is impossible use common grounding as shown on the figure bellow.

Chapter 3 – VFD Display Operation

VFD is supplied with DU07 keypad. Next chapter will explain basic DU07 operation. M7000 drives can also use PU07 keypad which is advanced version.

4.1 Operation panel (FR-DU07)

4.1.1 Parts of the operation panel (FR-DU07)



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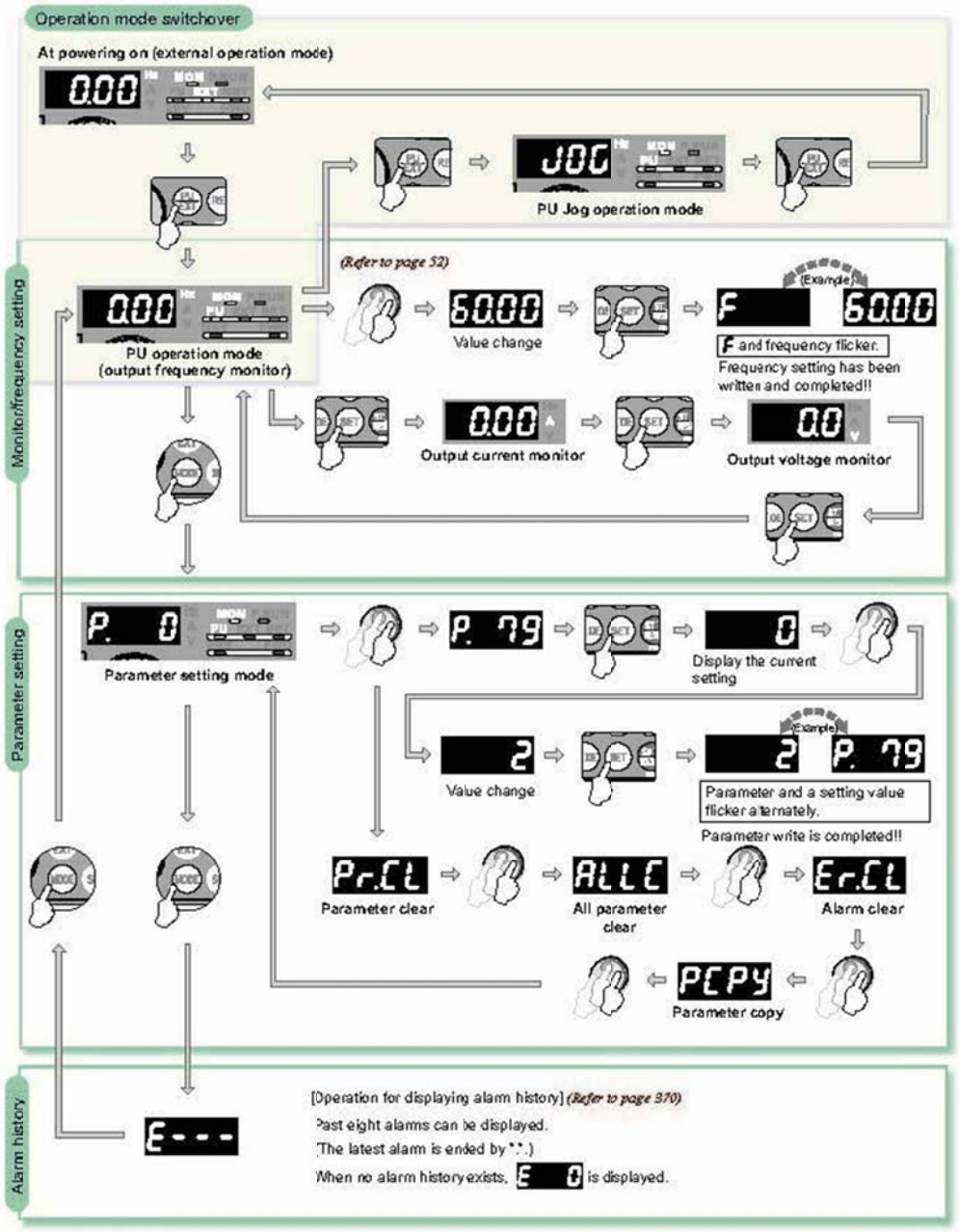
4.1.2 Basic operation (factory setting)



4.1.3 Change the parameter setting value

Changing example | Change the *Pr. 1 Maximum frequency*.

Operation	Display
1. Screen at powering on The monitor display appears.	
2. Press PU/EXT to choose the PU operation mode.	PU indication is lit. 
3. Press MODE to choose the parameter setting mode.	 (The parameter number read previously appears.)
4. Turn dial until P. 1 (*Pr. 1*) appears.	
5. Press SET to read the currently set value. "120.0" (initial value) appears.	
6. Turn dial to change it to the set value "60.00".	
7. Press SET to set.	

Flicker ··· Parameter setting complete!!

- By turning dial, you can read another parameter.
- Press SET to show the setting again.
- Press SET twice to show the next parameter.
- Press MODE twice to return the monitor to frequency monitor.

? Er 1 to Er 4 are displayed ... Why?

- Er 1 appears. ..... Write disable error
- Er 2 appears. ..... Write error during operation
- Er 3 appears. ..... Calibration error
- Er 4 appears. ..... Mode designation error

For details refer to *page 376*.

REMARKS

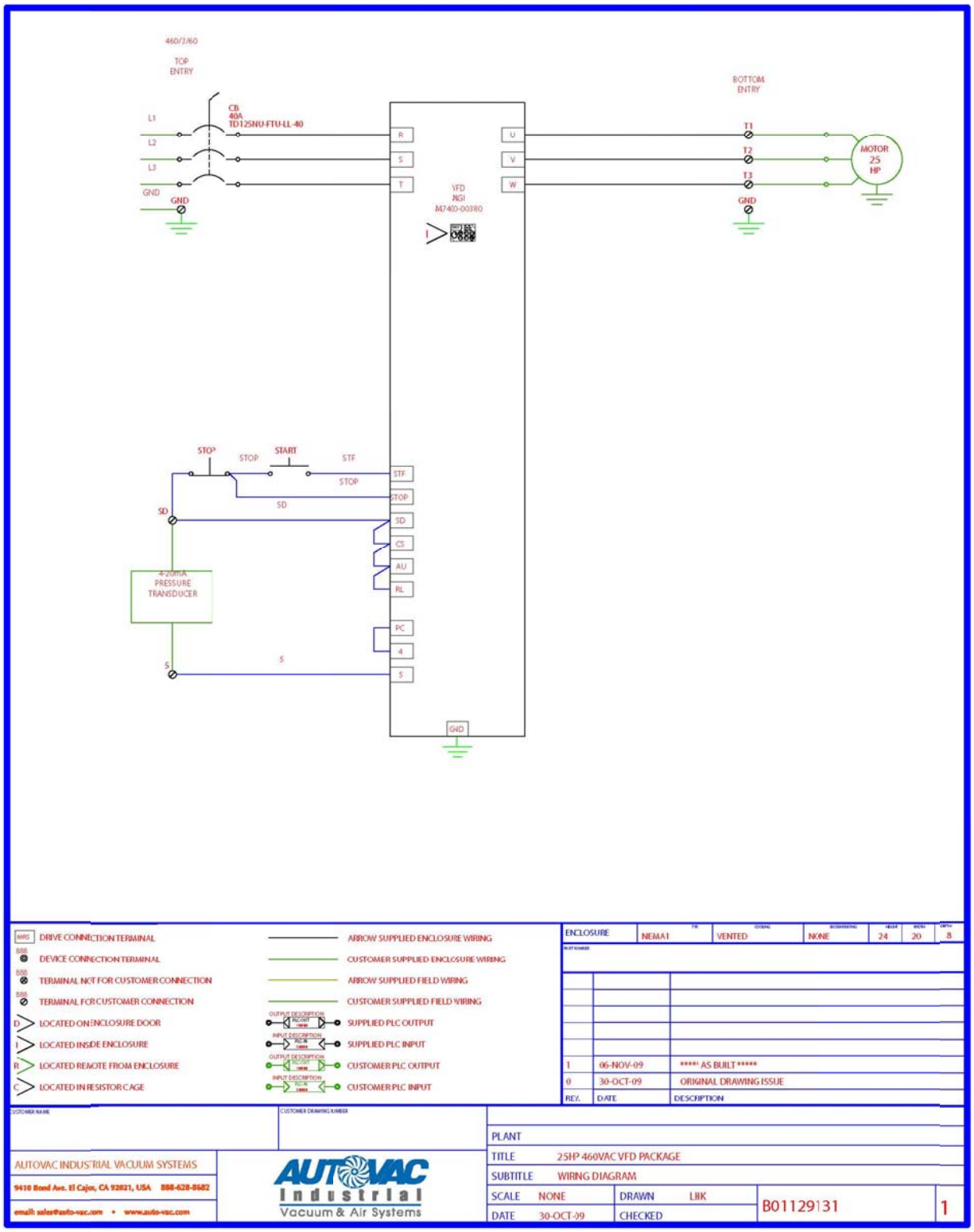
The number of digits displayed on the operation panel (FR-DU07) is four.
If the values to be displayed have five digits or more including decimal places, the fifth or later numerals can not be displayed nor set.

(Example) When *Pr. 1*
When 60Hz is set, 60.00 is displayed.
When 120Hz is set, 120.0 is displayed and second decimal place is not displayed nor set.

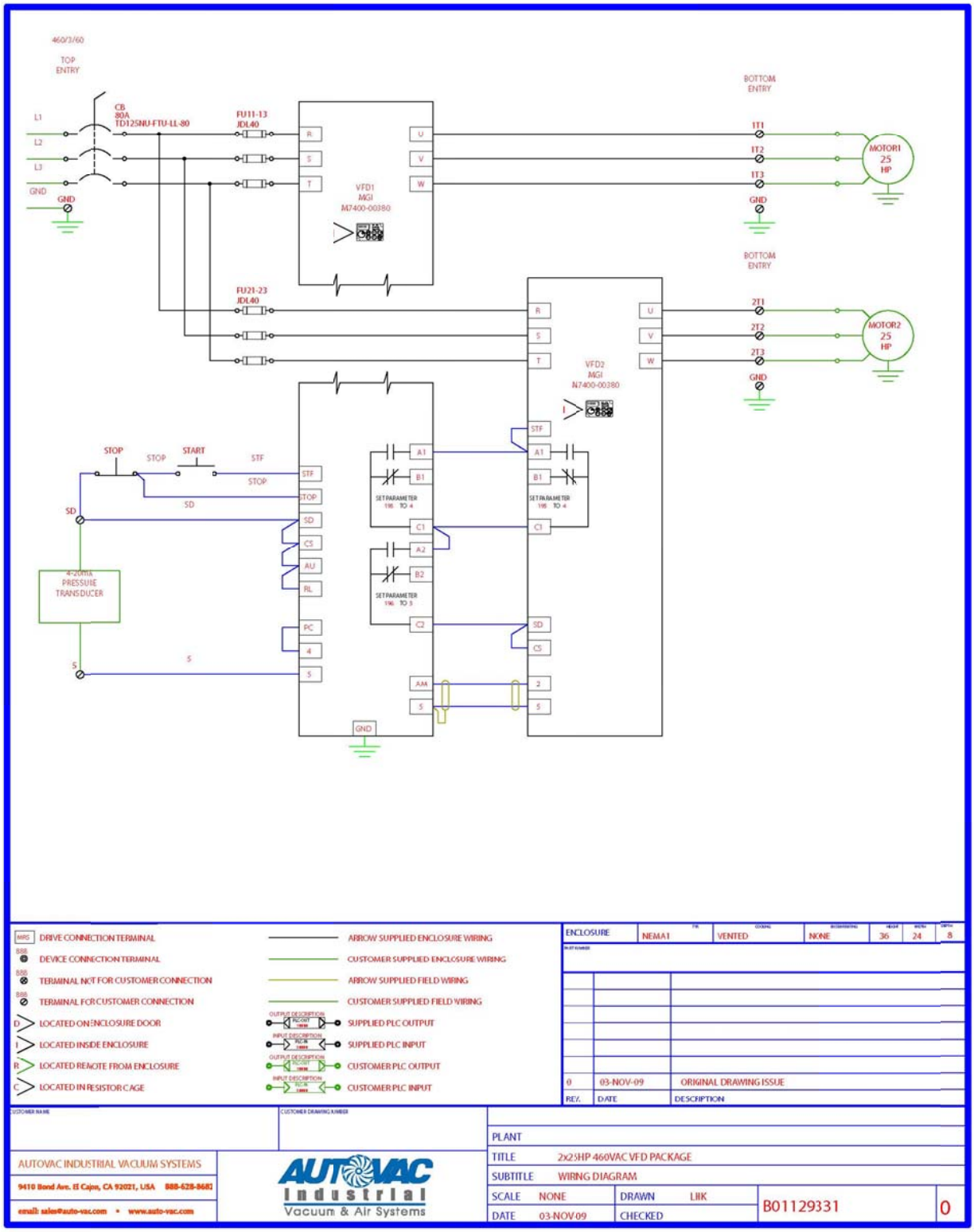
4.1.4 Setting dial push

Push the setting dial ( ) to display the set frequency currently set.

Chapter 4 – AutoCad Drawings Terminal Connection
Case 1 – Single motor



Case 2 – Two motors



Case 3 – Three motors

Chapter 5 – VFD Parameter Settings

The Variable Frequency Drives are shipped with the parameter values shown in Parameter Tables and no further programming should be necessary. However, if additional fine tuning is required please refer to ***Chapter 3, VFD Display Operation.***

5.1. – VFD Parameter Settings for Single motor configuration

Autovac Settings - Single VFD		
Parameter	Parameter Description	Setting
Pr 1	Maximum frequency	60 Hz
Pr 2	Minimum frequency	35 Hz
Pr 7	Acceleration time	30 sec
Pr 8	Deceleration time	30 sec
Pr 9	Electronic thermal O/L relay	motor FLA
P14	Load pattern selection	0
Pr 19	Base frequency voltage	motor voltage
Pr 57	Restart coasting time	1 sec
Pr78	Reverse rotation prevention	1
Pr58	Restart cushion time	5 sec
Pr 128	PID action selection	21
Pr 130	PID integral time	5 sec
Pr 133	PID action set point	43%
Pr 162	Automatic restart after IPF selection	10
Pr 180	RL terminal function selection	14
Pr 250	Stop selection	0
Pr 267	Terminal 4 input selection	0
Pr 904	Terminal 4 frequency setting bias frequency	87.50%

5.2. – VFD Parameter Settings for 2 motor configuration

Master VFD

Parameter	Parameter Description	Setting
Pr 1	Maximum frequency	60 Hz
Pr 2	Minimum frequency	35 Hz
Pr 7	Acceleration time	30 sec
Pr 8	Deceleration time	30 sec
Pr 9	Electronic thermal O/L relay	motor FLA
P14	Load pattern selection	0
Pr 19	Base frequency voltage	motor voltage
Pr 42	Output frequency detection	60 Hz
Pr 50	Second output frequency detection	46 Hz
Pr 57	Restart coasting time	1 sec
Pr58	Restart cushion time	5 sec
Pr78	Reverse rotation prevention	1
Pr 128	PID action selction	21
Pr 130	PID integral time	5 sec
Pr 133	PID action set point	43%
Pr 162	Automatic restart after IPF selection	10
Pr 180	RL terminal input selection	14
Pr 195	ABC1 terminal function selection	4
Pr 196	ABC2 terminal function selection	5
Pr 250	Stop selection	0
Pr 267	Terminal 4 input selection	0
Pr 904	Terminal 4 frequency setting bias frequency	87.50%

Slave VFD

Pr 1	Maximu frequency	60 Hz
Pr 2	Minimum frequency	35 Hz
Pr 7	Acceleration time	30 sec
Pr 8	Deceleration time	30 sec
Pr 9	Electronic thermal O/L relay	motor FLA
Pr 14	Load pattern selection	0
Pr 19	Base frequency volatge	motor voltage
Pr 57	Restart coasting time	1 sec
Pr 58	Restart cushion time	5 sec
Pr 73	Analog input selection	0
Pr 162	Automatic restart after IPF selection	10
Pr 195	ABC1 terminal function selection	4
Pr 250	Stop selection	0

5.2. – VFD Parameter Settings for 3 motor configuration

Master VFD

Parameter	Parameter Description	Setting
Pr 1	Maximum frequency	60 Hz
Pr 2	Minimum frequency	35 Hz
Pr 7	Acceleration time	30 sec
Pr 8	Deceleration time	30 sec
Pr 9	Electronic thermal O/L relay	motor FLA
P14	Load pattern selection	0
Pr 19	Base frequency voltage	motor voltage
Pr 42	Output frequency detection	60 Hz
Pr 50	Second output frequency detection	46 Hz
Pr 57	Restart coasting time	1 sec
Pr58	Restart cushion time	5 sec
Pr78	Reverse rotation prevention	1
Pr 128	PID action selection	21
Pr 130	PID integral time	5 sec
Pr 133	PID action set point	43%
Pr 162	Automatic restart after IPF selection	10
Pr 180	RL terminal input selection	14
Pr 195	ABC1 terminal function selection	4
Pr 196	ABC2 terminal function selection	5
Pr 250	Stop mode	0
Pr 267	Terminal 4 input selection	0
Pr 904	Terminal 4 frequency setting bias frequency	87.50%

Slave # 1 VFD

Pr 1	Maximum frequency	60 Hz
Pr 2	Minimum frequency	35 Hz
Pr 7	Acceleration time	30 sec
Pr 8	Deceleration time	30 sec
Pr 9	Electronic thermal O/L relay	motor FLA
Pr 14	Load pattern selection	0
Pr 19	Base frequency voltage	motor voltage
Pr 42	Output frequency detection	60 Hz
Pr 50	Second output frequency detection	45 Hz
Pr 57	Restart coasting time	1 sec
Pr 58	Restart cushion time	5 sec
Pr 73	Analog input selection	0
Pr 162	Automatic restart after IPF slection	10
Pr 195	ABC1 terminal function selection	4
Pr 250	Stop mode	0

Slave # 2 VFD		
Pr 1	Maximum frequency	60 Hz
Pr 2	Minimum frequency	35 Hz
Pr 7	Acceleration time	30 sec
Pr 8	Deceleration time	30 sec
Pr 9	Electronic thermal O/L relay	motor FLA
Pr 14	Load pattern selection	0
Pr 19	Base frequency voltage	motor voltage
Pr 57	Restart coasting time	1 sec
Pr 58	Restart cushion time	5 sec
Pr 73	Analog input selection	0
Pr 162	Automatic restart after IPF selection	10
Pr 250	Stop mode	0