EZ Pad Scope II™

Air Modulator V

Operator's Guide and Instruction Manual

RAM INDUSTRIES INC

Table of Contents

Important Application Notes - Read First !

- Store to EEPROM - After all parameters have been set, it is important to execute the “Store to EEPROM” function in the QUICK Menu mode. To do this go to QUICK Menu “Store to EEPROM” selection. Press STORE/ENTER. On the L100 inverters the display on the base drive itself will read “COPY” for a few seconds; on the J300 the display on the EZ Pad will not change, wait a few seconds then press MONITOR to get back to the operating screen.

- HAND/AUTO Mode – When the inverter is placed into HAND mode, the control of the start/stop and speed reference is from the EZ Pad keypad. If a power outage occurs, the inverter will NOT automatically restart when it is left in the HAND mode. It is important to place the drive in AUTO mode to insure that it will restart automatically after a power outage or interruption. In order to have the inverter come up in the HAND mode and automatically restart after a power outage, you must perform the following procedures:

L100’s (½ to 10 HP) - Place the inverter in HAND Mode data value “r: TRM /f: VM”. The inverter speed will follow the potentiometer on the front case of the inverter and you must provide a maintained contact closure between P24 and Terminal 1 for a forward run command. Go to the QUICK Menu and perform the “Store to EEPROM” function. The inverter LED display will show “COPY” for a few seconds while the data is downloaded. After you have performed these steps, the inverter will automatically come back up to the speed it was at before the power outage.

J300’s (15 to 350 HP) - Place the inverter in HAND Mode data value “r: TRM/ f: OPE“. The inverter speed will follow what has been set on line 2 of the EZ Pad keypad. You must provide a maintained contact closure between CM1 and Terminal FW for a forward run command.

On both series of inverters, you must make and break the forward run command when switching between HAND/AUTO modes.

- External Speed Reference - When using the EZ Pad keypad it is NOT necessary to wire a jumper between P24–3 (AT Select); on L100 or CM1-2 (AT Select); on J300 to select between 0-10VDC and 4-20mA external speed references. The EZ Pad QUICK Menu selection forces this terminal on or off to perform the selection. If a jumper has been wired in these terminals the reference selection will be the opposite of what is selected in the QUICK Menu.

- If you are experiencing problems using the EZ Pad keypad, the inverter can be operated with the standard basic keypad in place of the EZ Pad. The L100 inverter has a non-removable standard basic keypad. If you would like to return to using that keypad simply unplug the EZ Pad keypad from the inverter. On the J300 inverter, we are shipping the standard basic LED keypad along with the inverter. To return to using the basic LED keypad on the J300 inverter, simply unplug the EZ Pad and plug in the basic keypad to the inverter. It is held down by two screws on the logic board.

- It is not recommended to remove the EZ Pad keypad while the drive is running or has input power applied to it.

Air Mod Quick Start Up

- The YORK Air Mod is pre-programmed for HVAC default values. Only minimal changes may be required.
- Check all power wiring and control wiring to the Air Mod drive and optional bypass cabinet, if provided, to insure proper wiring terminations have been made.
- Set up Air Mod drive parameters using the QUICK MENU parameters.
- Follow the "Navigating the *EZ* Pad" example to make parameter data changes.
- Press MONITOR key to view process variables.
- Select desired HAND AUTO mode for operation.
- The Air Mod drive is now ready to be started.

Navigating the *EZ* Pad™

Press QUICK MENU ,use ↕ to select parameter, press CHANGE DATA to select data value (display will read > 7.5kw <) use ↕ to scroll through data choices or ↔ to move cursor to highlight data value. Once data selection has been made, press STORE ENTER key, data value will be stored. If you decide not to make a data change, simply press CANCEL to get back to the previous mode.

CAUTION: Turn power off to the Air Mod drive before removing or connecting the *EZ* Pad™ Keypad

MONITOR

- Places the drive into the Monitor mode.

Line 1	VAR 1.1 VAR 1.2 VAR 1.3	←Process Variables
Line 2	Set Freq Actual Freq	←Set Freq. & Actual Freq. or Var 2
Line 3	rOPE / fOPE Fwd	←Hand/Auto Status
Line 4	Ramp Up	←Active Status

The display will show 3 process variables on Line 1, the Set Frequency and Actual Frequency on Line 2, Hand/Auto Status on Line 3, and Active Status on Line 4. By pressing the MONITOR display will toggle to show which process variables were programmed for data values: Var 1.1, 1.2, 1.3, and Var 2. You can access the Monitor mode from any other mode by pressing MONITOR. The drive should be left in Monitor mode once all programming is complete.

Monitor Mode Display

Line 1 shows three process variables. VAR 1.1, 1.2, and 1.3 can be programmed in the Program Mode. The choice of variables displayed are: Output Current in % or Amps, Rotation Speed RPM, Current Frequency Hz, PN Voltage (Vdc), Scaled Frequency, Output Torque %, Input voltage (Vac), kW Power, kW Hours, Elapsed Time.

Line 2 shows the Set Frequency and the Actual Frequency when in Hand mode, or when in Auto mode VAR 2 is displayed.

Line 3 shows Hand/Auto mode. **rOPE** indicates **run** signal from keypad operator. **rTRM** indicates **run** command is from the drive terminal. **fOPE** indicates **frequency** setting is from the keypad operator. **fTRM** indicates that **frequency** setting is from the drive terminal.

Line 4 shows the active status of the drive. Ramp up, ramp down, constant speed, etc.

QUICK MENU

- **Motor Capacity**
  Set value in kw, equal to motor HP being applied to drive. Example: 1 HP = .746kw (Not Applicable on L100s)

- **Input Voltage**
  Set value equal to applied input voltage to the drive 200-230V, 380-460V.

- **Base Frequency**
  Set value to base frequency of motor. Usually 60 Hz, check motor nameplate if value other than 60 Hz is required. Default setting is 60 Hz.

- **Maximum Frequency**
  Set value to maximum controlled output frequency of drive. Default is 60 Hz. Operation above 60 Hz may cause mechanical damage.

- **Minimum Frequency Limit**
  Set value to desired minimum output frequency limit corresponding to external reference minimum. When drive receives a run command, it will run at this set speed until an external (0-10VDC, 0-5VDC 4-20mA) reference causes a speed change. Default setting is 15 Hz.

- **Maximum Frequency Limit**
  Set value to desired maximum output frequency limit corresponding to external reference maximum. The drive output will not exceed this value. When external reference is at maximum (10V, 5V, or 20mA), drive will run at this speed Default setting is 60 Hz.

- **Accel 1**
  Set to desired acceleration rate in seconds, shorter accel times may cause tripping. Default is 60 seconds.

- **Decel 1**
  Set to desired deceleration rate in seconds. Ideally this is set to match the motors actual coast down time. Default is 90 seconds, shorter time may cause tripping.

- **E-Thermal Level**
  Set the electric thermal overload level in accordance with the rated current of the motor in units of 1%.

  Default is 120%, Set value = $\frac{\text{Motor Nameplate FLA}}{\text{Inverter FLA}} \times 100$
  L100 set value in AMPS

- **Smoke Purge Frequency**
  Set the preset speed the drive will run at when a contact closure is made to the multispeed input terminal. A contact closure will override an external speed reference. See drawings for details. Default is 60 Hz.

- **External Speed Reference**
  Set the type of external signal for speed reference applied to the drive. 0-10VDC, 0-5VDC, or 4-20mA. 0-10VDC, 0-5VDC on terminal O and L (common), 4-20mA on terminal OI and L (common).

- **Terminal I/O Status**

FW	8	7	6	5	4	3	2	1	TERMINAL
L	L	L	L	L	L	L	L	L	STATUS

  Displays the status of each I/O terminal. A L indicates no contact closure to terminal. A H indicates contact closure to terminal. This status can be used in troubleshooting input control wiring.

- **Terminal Frequency Status**
  Indicates the value of external speed reference the drive is receiving on terminals O and L, or OI, and L. This status can be used to confirm that the drive is receiving an external reference.

  L100s - VM Frequency Status shows speed pot on base inverter front cover set value.
  - **Store to EEPROM** - After all data changes have been made, execute STORE to EEPROM by pressing STORE/ENTER. The J300 display will not change, Press MONITOR to return to normal operation.

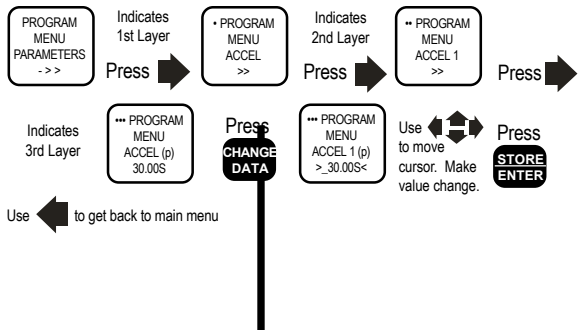
PROGRAM

NOTE: Access to Program mode is typically not required because YORK HVAC settings are pre-programmed.

- Places the drive into Program mode. The Program mode is a multi-layered structure. Main menus are: Monitor Variables, Status, Trips, Parameters, Reset kw Hours, and Switch mode. Use the ◆ to navigate the menu layers.

Structure Example:	Main	2.	Parameters
	Layer 1	2.4	Accel
	Layer 2	2.4.1	Accel 1
	Layer 3	2.4.1.1	Accel (p)
	Data Value		> 30.00S <

Programming Example:



HAND
AUTO

- Selects where the drive will receive a Run command and a Frequency command. There are 4 modes of HAND/AUTO operation. To change modes, press HAND AUTO

MODE	DISPLAY LINE 3	RUN COMMAND VIA	FREQUENCY COMMAND VIA
AUTO	r TRM / f TRM	Terminal FW/ Forward	Terminal O & L or OI & L
HAND & AUTO	r TRM / f OPE	Terminal FW/ Forward	Operator Keypad
HAND	r OPE / f OPE	Operator Keypad	Operator Keypad
HAND & AUTO	r OPE / f TRM	Operator Keypad	Terminal O & L or OI & L

L100 DRIVES HAVE AN ADDITIONAL HAND/AUTO MODE:

MODE	DISPLAY LINE 3	RUN COMMAND VIA	FREQUENCY COMMAND VIA
HAND & AUTO	r TRM / f: VM	Terminal	Drive Speed Pot
HAND & AUTO	r OPE / f: VM	Operator Keypad	Drive Speed Pot

In HAND MODE (rOPE / fOPE), press CHANGE DATA , >_ 60.00 < on Line 2 highlights the last set frequency. Use ◀▶ to move cursor over data value digit. Use ▲▼ to change data value, press STORE ENTER . The drive will now run at the set speed, the actual frequency will be displayed on Line 2 on the right.

In AUTO MODE (r TRM / f TRM), the drive will respond to a Run command and an External Frequency command from the drive terminal strip.

In HAND & AUTO mode, the drive will combine the functions as indicated in table.

OTHER KEYS

HELP — Will guide you through troubleshooting information by using the ▲▼ to scroll through text. When a fault occurs, press HELP to find a possible solution.

READ WRITE — Will enable the keypad to “Read EEPROM Data” from the drive or “Write EEPROM Data” from the keypad to the drive. Use ▲▼ to select, then press STORE ENTER . This feature will allow you to copy parameters to other drives.

CANCEL — Use this key to cancel an action or data change.

STORE ENTER — Use this key to Store/Enter a data change to the drive.

STOP RESET — Use this key to stop the drive from the keypad or to reset the drive from a fault condition.

START — Use this key to give the drive a “Start” command. Only active when in Hand Mode (“rOPE” is displayed on Line 3).

MODE — Used to edit and configure keypad and other special functions. This feature is not required during normal operations.

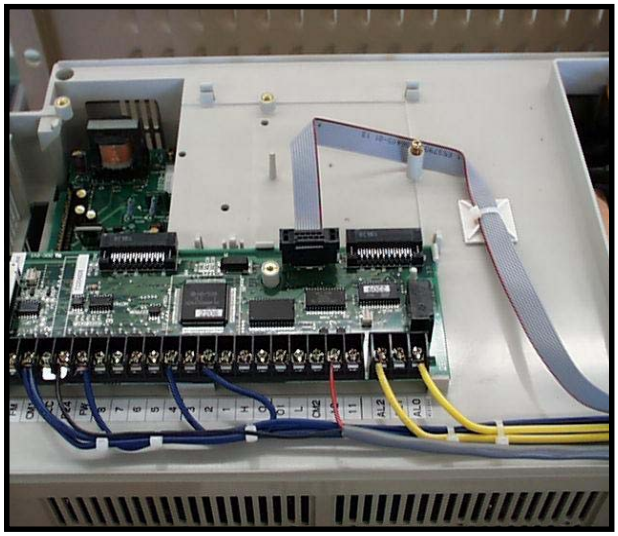
LEDs

- ❍ POWER Indicates power applied to drive
- ❍ RUN Indicates drive is running
- ❍ FAULT Indicates drive has a fault

Installation of *EZ*Pad Keypad

The EZ Pad is shown mounted on the option enclosure. The keypad snaps into a plastic bezel which is mounted on a metal standoff. A cable to the inverter logic board is plugged into the back of the EZ Pad keypad. This configuration also allows retrofitting to previous Air Mod V models.

Turn power off to the inverter before disconnecting cable to the EZ Pad. The ribbon cable connector is keyed to fit onto the logic board in a specific orientation. On the L100 inverter, which is used from ½ to 10 HP the ribbon cable has a phone jack plug, which simply gets plugged into the bottom of the inverter. The L100 display is not removable.



NOTE: On J300 (AMV 15-350HP) base drives without options the EZ Pad plugs into the cover of the inverter. Take care to insert the EZ Pad carefully so that the plug connection is not damaged. To remove the EZ Pad from the plastic bezel, insert a screwdriver into the top slots and pop out the keypad from the bezel.

Program Mode

The drive software is configured in layered menus with sub-menus. The display on the EZ Pad will show a **>>** on line 4 to indicate that there is a sub-menu or function to be performed. Use the up/down arrow keys to navigate through the menu. Use the CANCEL key to get back to the previous level. The menu level is indicated by the presence of one or more dots on line 1.

EZ Pad Display Example:

MAIN MENU

```
PROGRAM MENU
     0.000Hz
Parameters
_>>
```

LAYER 1 SUB-MENU

```
• PROGRAM MENU
     0.000Hz
Command
_ >>
```

LAYER 2 SUB-MENU

```
•• PROGRAM MENU
     0.000Hz
Freq Set Method
_TRM
```

In “Program” mode the main menus are structured as follows:

Monitor Variables
Parameters
Status
Trips
Network Control
Debug Mode
Edit Mode
DOP Mode
Reset KW Hours (J300 only)

Each main menu is further divided into layers or sub-menus as indicated:

Monitor Variables

Allows selection of the process display variables shown on the EZ Pad keypad when you are in Monitor Mode. Choose from Current Frequency, Scaled Frequency, Rotation Speed, Output Current in Amps, Output Current in %, Output Torque in %, PN Voltage (Vdc), Input Voltage (Vac), kW Power, kW Hours, Elapsed Run Time.

Sub-menus:	Function:
• Var 1.1	Displays the selected variable on EZ Pad line position 1.1
• Var 1.2	Displays the selected variable on EZ Pad line position 1.2
• Var 1.3	Displays the selected variable on EZ Pad line position 1.3
• Var 2	Displays the selected variable on EZ Pad line position 2

Parameters

Contains the extended software parameters for programming and setting up the drive functionality. The QUICK MENU mode on the keypad covers the most common parameter settings. Typical HVAC settings and start up parameters will be included in the QUICK MENU mode. If the application requires special settings, the extended software parameters can be accessed using the PROGRAM mode.

In the following parameter explanation a●, ● ●, or ● ● ● indicates what layer the particular parameter is in the structure. A ♦ indicates the factory default setting for that particular function followed by the range of data choices or the other data settings available for that particular parameter.

The software in the drive has the capability of storing two sets of data; a primary set (p) and a secondary set (s). The choice between which data set is used can be changed via the terminal strip. For all York HVAC settings the primary (p) data set is used, disregard any values shown in the secondary set (s) since they will not apply.

● Command

Programs where the drive will receive Frequency Setting, Run Setting, and Parameter Setting commands from either OPE (operator), TRM (terminal), OPT1 (option card 1), or OPT2 (option card 2). The Freq. Set Method and the Run Set Method follow the settings and functionality of the Hand-Auto key. If the data value of this parameter is changed it will over-ride what the Hand-Auto key has been set at.

Sub-menus:	Function:
● ● Freq. Set Method	Indicates where the frequency will be set from
● ● Run Set Method	Indicates where the run command will be set from
● ● Param Set Method	Indicates where the parameters will be set from ¨ OPE

● Initial

Programs specific initial functions of the Trip History, Debug Mode, and the Direction on the basic keypad.
These parameters do not need to be changed.

Sub-menus:		Function:			
● ● Trip History Mode	♦	CNT	=	trip counting is continued	
		CLR	=	trip count is cleared	
● ● Enable Debug Mode		ON	=	debug mode enabled	Only used to access special
	♦	OFF	=	debug mode disabled	parameters. Consult factory on use.
● ● Direction Setting	♦	FWD	=	forward run from start key	
		REV	=	reverse run from start key	

• Control

Parameters include basic drive V/Hz patterns and Motor data settings.

Sub-menus:	Function:
•• V/F Settings	
••• Base Freq	♦ 60Hz Sets the value at which 100% voltage will be outputted
••• Max Freq	♦ 60Hz Sets the maximum frequency the drive will output
••• OPE Set Freq	Displays what frequency has been set in the HAND mode
••• Jogging Freq	♦ 0 Hz Sets the value of a jog frequency enabled by contact closure
••• Start Freq	♦ 0.5Hz Sets the starting output frequency of the drive Not the minimum speed setting
••• Ctrl Method	Programs the drive for variable or constant torque curves ♦ VP1 variable torque high VP2 variable torque medium VP3 variable torque low VC constant torque SLV sensorless vector control V2 vector control with feedback
••• V/F Pattern	Not Used - Do Not Modify Data ♦ C, 60Hz, 120Hz
••• Input Voltage	Programs the input voltage 200V-480V
••• AVR Dec	♦ OFF set the automatic voltage reduction
•• Motor Data	Auto Tuning Function **Not used in HVAC** Contains parameters for automatically tuning a motor
••• Auto Tuning	♦ NOR, AUT enables or disables auto tuning
••• Motor Const Data	♦ NOR selects type of motor data for auto tuning
••• Motor Pole Count	♦ 4P selects motor poles 2, 4, 6, 8 for auto tuning
••• Motor Capacity	Rated capacity of the inverter, Data matches what is set in Quick Menu
••• Motor Cap (eu)	Auto tuning data, not required for HVAC
••• Resistor R1	Auto tuning data, not required for HVAC
••• Resistor R2	Auto tuning data, not required for HVAC
••• Inductor L1+L2	Auto tuning data, not required for HVAC
••• Mut Inductor M	Auto tuning data, not required for HVAC
••• Inertia J	Auto tuning data, not required for HVAC
••• ASR Kp	Auto tuning data, not required for HVAC
••• ASR Ti	Auto tuning data, not required for HVAC
••• ASR Kpp	Auto tuning data, not required for HVAC
•• Carrier Frequency	Sets the carrier freq of the inverter. Range from 2-16kHz. Factory default depends on size of inverter. Typically this Parameter is left at factory defaults.

• Accel

Sets the acceleration time of the inverter.

Sub-menus:	Function:
•• Accel 1	♦ 60 seconds. Range 0.1 to 3000 seconds.
•• Accel 2	Sets the second acceleration time. Enabled by contact closure.
•• Accel Curve	♦ L (linear), S shaped, U shaped, RU reverse U shaped
•• Curve Constant	♦ 2 adjusts curve gain from 0-10

• Decel

Sets the deceleration time of the inverter.

Sub-menus:	Function:
•• Decel 1	♦ 90 seconds. Range is 0.1 to 3000 seconds
•• Decel 2	Sets the second deceleration time. Enabled by contact closure.
•• Decel Curve	♦ L (linear), S shaped, U shaped, RU reverse U shaped
•• Curve Constant	♦ 2 adjusts curve gain from 0-10

• Operation

Contains special acceleration parameters. Not used in HVAC.

Sub-menus:	Function:
•• Frequency Stop	The freq. and time duration at which the acceleration time is temporarily stopped.
••• Stop Freq	♦ 0 Hz. Range is 0 to 400 Hz
••• Freq Stop Time	♦ 0.0 seconds. Range is 0 to 60 seconds
•• Operation Pattern	Sets the running or operating mode of the inverter. Also sets the patterned run mode, which is not used in HVAC.
••• Mult.spd./Proc.adv.	♦ SPD, PRC pattern run command
••• Operation Mode	♦ NOR normal, OEN energy conservation, GOD Fuzzy Accel/Decel
••• Oper after FRS	♦ FST freq match restart, ZST 0 Hz. restart
•• Multi-stage speed	Sets the pre-programmed multiple speeds enabled by contact closures.
••• Multi-Spd Freq 1	Sets the smoke purge speed. Matches what is set in quick menu.
••• Multi-Spd Freq 2	Multiple Frequency enabled by contact closure. Not used in HVAC.
••• Multi-Spd Freq 3	Multiple Frequency enabled by contact closure. Not used in HVAC
••• Multi-Spd Freq 4	Multiple Frequency enabled by contact closure. Not used in HVAC
••• Multi-Spd Freq 5	Multiple Frequency enabled by contact closure. Not used in HVAC
••• Multi-Spd Freq 6	Multiple Frequency enabled by contact closure. Not used in HVAC
••• Multi-Spd Freq 7	Multiple Frequency enabled by contact closure. Not used in HVAC
•• Process Advance	**Special software for PLC type functions. Range from 1 through 8 NOT in HVAC models. Data in these parameters is not valid for the HVAC version of the inverter. Changes will not effect the HVAC inverter application.**

● Braking

Sets the DC Braking functions of the inverter. Not Used in HAVC

Sub-menus:		Function:
●● DC Braking		DC Braking settings
●●● DCB Type	♦	LVL level or EDG edge. Trigger for DC Brake.
●●● DCB Freq	♦	0.5 Hz Range 0 to 400 Hz. Start freq of DC Braking.
●●● DCB Force (start)	♦	0 Range is 0-20. Sets braking force.
●●● DCB Force (stop)	♦	0 Range is 0-20. Sets braking force.
●●● DCB Time (start)	♦	0 sec. Range 0-600 seconds of braking time.
●●● DCB Time (stop)	♦	0 sec. Range 0-600 seconds of braking time
●●● DCB Shutoff Time	♦	0 sec. Range 0-5 seconds. Time of coast after braking.
●● Regen Brake Ratio	♦	1.5% Range 0-100 Sets the dynamic braking ratio of the braking resistor if used for a time of 100 seconds.

● Protection

Contains parameters for setting thermal and current limit functions.

Sub-menus:		Function:
●● E-Thermal		Sets the electronic thermal overload level
●●● E-Thermal Char	♦	SUB variable torque CRT constant torque
●●● E-Thermal Level	♦	120% Range 20-120% of inverter output capacity
●●● E-Thermal Current 1		Used for custom thermal curve. Not used in HVAC.
●●● E-Thermal Freq 1		Used for custom thermal curve. Not used in HVAC.
●●● E-Thermal Current 2		Used for custom thermal curve. Not used in HVAC.
●●● E-Thermal Freq 2		Used for custom thermal curve. Not used in HVAC.
●●● E-Thermal Current 3		Used for custom thermal curve. Not used in HVAC.
●●● E-Thermal Freq 3		Used for custom thermal curve. Not used in HVAC.
●● Overload		Sets the overload restriction or soft stall characteristics.
●●● OLoad Limit Level	♦	150% Range 50-150% of inverter current capacity
●●● OLoad Limit Const	♦	5 sec. Range 0.3 to 30 seconds of soft stall time
●●● OLoad Limit Acc	♦	ON soft stall on during acceleration or OFF

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PROTECTION CONTINUED FROM PAGE 13

Sub-menus:		Function:
●● Freq Protection		Sets frequency skip and freq. min/max characteristics.
●●● Min Freq Limit	♦	15Hz Range 0 to 120Hz
●●● Max Freq Limit	♦	60Hz. Range 0 to Max Freq. Operation over 60 Hz on HVAC not recommended. May cause mechanical damage HVAC systems.
●●● Jump Freq 1	♦	0Hz Range 0 to Max Freq. Allows selection jump freqeuncy.
●●● Jump Freq 2	♦	0Hz Range 0 to Max Freq. Allows selection jump frequency.
●●● Jump Freq 3	♦	0Hz Range 0 to Max Freq. Allows selection jump frequency.
●●● Jump Freq Width	♦	0.5Hz Range 0 to 9.9 Hz. Set bandwidth of jump freq 1,2,3.
●● IPS		Set Instantaneous Power Failure Characteristics
●●● IPS Failure Time	♦	25 sec. Range 0 to 25sec. When an Instantaneous Power Failure occurs on the 3 phase input line, the inverter will wait until power is restored. This allows time for the inverter capacitors to fully discharge before a restart is made.
●●● IPS Wait Time	♦	1 sec. Range 0 to 100 sec. This will cause the inverter to wait a specified time after the IPS Failure time has timed out before allowing a restart.
●●● IPS Restart Op	♦	RST restart, ALM alarm, ZST 0Hz restart, FTP freq. match. Sets the inverter restart after power interruption.
●●● IPS Tripping	♦	OFF unit will not trip, ON unit will trip after IPS.
●● Other		Contains special function parameters.
●●● Max Freq Select	♦	120Hz or 400 Hz. Sets inverters max output frequency range.
●●● Software Lock	♦	MD1 software lock by terminal activation. Terminal needs to be programmed for this function. MD0,MD2,MD3 software is locked from keypad.
●●● STOP Key Enable	♦	ON or OFF. Enables STOP key on keypad during terminal running.
●●● Operation Direction	♦	FRE Enables both forward and reverse run capability. FWD forward only, REV reverse only.
●●● Rev Run Prevention	♦	OFF or ON. Prevents reverse running.

● Terminal

Contains parameters for setting all Input and Output Terminals.

Sub-menus:		Function:
●● Analog Input		
●●● Analog Input Voltage		Sets the analog voltage input from 0-5VDC or 0-10VDC. Matches what is set in Quick Menu Mode.
●●● Analog Meter Correction	♦	172 Sets an internal adjustment to the FM output terminal scaling. There is no need to change this value.
●●● Ext Freq (start)	♦	15Hz. Sets the starting frequency point when the inverter. Receives minimum external reference (0 V or 4 mA).
●●● Ext Freq (stop)	♦	60 Hz. Sets the ending frequency point when the inverter receives. maximum external reference (5VDC, 10VDC, or 20mA).
●●● Ext Freq % (start)	♦	0% Sets the bias of the analog input signal.
●●● Ext Freq % (stop)	♦	100% Sets the bias of the analog input signal.

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TERMINAL CONTINUED FROM PAGE 15

Sub-menu:	Function:
●● Signal Output	Contains parameters for setting Frequency Arrival and Over torque signal conditions when they are selected as a criteria for output on output relay 11 and 12.
●●● Freq Arv Pattern	♦ CST output at constant speed PAT Output of more than set frequency ANY Output of only the set frequency
●●● Targ Accel Freq	♦ 0Hz. Range 0-400Hz. Signal output to relay 11 or 12 when freq is reached during acceleration.
●●● Targ Decel Freq	♦ 0Hz. Range 0-400Hz. Signal output to relay 11 or 12 when freq. is reached during deceleration.
●●● Ov-Trq Power	♦ 100% Range 0-250%. Signal output to relay 11 or 12 at programmed % power of over torque during running.
●●● Ov-Trq Sig Regen	♦ 100% Range 0-250%. Signal output to relay 11 or 12 at programmed % of over torque during regeneration.

●● Terminal Definitions	Contains parameters which determine the intelligent terminal configuration. Terminals can be assigned an input function and contact state (N.O. or N.C).

Terminal functions:

REV	=	Reverse	CF1	=	Multispeed 1	CF2	=	Multispeed 2
CF3	=	Multispeed 3	JG	=	Jogging	DB	=	Ext DC Braking
STN	=	Re-initialize	SET	=	2nd Data Set	CH1	=	2nd Accel/Decel
FRS	=	Free Run Stop	EXT	=	Ext Trip	USP	=	Start Prevention
CS	=	Comm Power Sw.	SFT	=	Software Lock	AT	=	Analog Ref. Select
RS	=	Reset	UP	=	Digital Spd.Up	DWN	=	Digital Spd.Down

	L100 Drive	J300 Drive
●●● Input Pin 1	♦ FW = Forward	♦ RS = Reset
●●● Input Pin 2	♦ REV = Reverse	♦ AT = Analog Select
●●● Input Pin 3	♦ AT = Analog Select	♦ JG = Jog
●●● Input Pin 4	♦ USP = Start Prev.	♦ FRS = Free Run Stop
●●● Input Pin 5	♦ RS = Reset	♦ CH1 = 2nd Accel/Decel
●●● Input Pin 6	not available	♦ USP = Start Prev.
●●● Input Pin 7	not available	♦ CF1 = Multispeed (Smoke Purge)
●●● Input Pin 8	not available	♦ REV = Reverse

NOTE: Status of Input Pins can be selected for NO normally open or NC normally closed. The AT select pin will follow what is set in the Analog Select using the Quick Menu. This forces the contact status so either a voltage or current reference is selected. When using the EZ Pad keypad it is not necessary to wire a jumper between CM1 and AT, if a wire jumper is in place the inverter will act opposite of the analog selection in the Quick Menu because the software will over write the input.

●●● Input Pin 1 NO/NC	♦ NO	♦ NO
●●● Input Pin 2 NO/NC	♦ NO	♦ NO
●●● Input Pin 3 NO/NC	♦ NO	♦ NO
●●● Input Pin 4 NO/NC	♦ NO	♦ NO
●●● Output Pin 11	♦ FA = Frequency Arrival	
●●● Output Pin 12	♦ RUN = Run Indication	
●●● Output Pin 11 NO/NC	♦ NO	
●●● Output Pin 12 NO/NC	♦ NO	
●●● Alarm Output NO/NC	♦ NC	

●● Monitor Signal	Select the criteria of the FM terminal output. ♦ A-F = Analog Freq, A = Current, T = Torque, D-F = Digital Freq.

• Option Select

Option Board Error Setting. Not HVAC Applicable.

Sub-menu:	Function:
• • OP1 Error Oper.	♦ STP
• • OP2 Error Oper.	♦ STP

• Option Select

For use with Encoder Feedback Board J-FB Only.

Sub-menu:	Function:
• • Encoder Pulses	♦ 1024 pulses for encoder when using J-FB board
• • Option Ctrl Mode	♦ ASR
• • Option R0-T0	♦ OFF Keep off. For special use only!

• Orient

For use with Encoder Feedback Board J-FB Only.

Sub-menu:	Function:
• • Orient Stop Pos Chg	♦ IN or OUT sets stop position.
• • Orient Stop Pos	♦ 0 pulse. Range 0-4095 pulses sets stop position.
• • Orient Speed	♦ 5 Hz Range 0-400Hz. Sets speed setting.
• • Orient Direction	♦ FWD or REV orientation direction.
• • Orient End Range	♦ 5 pulses. Range 0-10000. Sets encoder completion range.
• • Orient End Delay	♦ 0 Sec Range 0-9.99 Sec. Sets encoder delay time.

• Position

For use with Encoder Feedback Board J-FB Only.

Sub-menu:	Function:
• • Gear Setting Pos.	♦ FB Feedback or REF reference.
• • Gear Ratio (num)	♦ 1 Sets the numerator for the gear ratio.
• • Gear Ratio (den)	♦ 1 Sets the denominator for the gear ratio.
• • Feed Fwd Gain	♦ 0.00 Sets the feed forward gain.
• • Positional Gain	♦ 0.50 rad/sec Sets the position loop gain.

• Torque

Contains parameters for setting torque limit functions.

Sub-menu:	Function:
• • Torque Limiter	♦ OPE Sets the torque limiter from the operator.
• • Fwd Torque Limit	♦ 150% Sets the plus torque limit.
• • Rev Torque Limit	♦ 150% Sets the regen torque limit.
• • Torque Boost	♦ 11 Range 0 to 100% of Voltage Sets the manual torque boost. Excessive values will cause tripping.
• • V-gain Set Value	♦ 100% Range 20 to 100%. Sets the voltage gain.

• PID

Contains parameters for PID functions.

Sub-menu:	Function:
• • PID Switching	♦ IN Set point is determined by Target PID range OUT Set point is determined by External Terminal Ref.
• • Feedback AC/DC	♦ AC or DC
• • Target PID Value	♦ 0.00% Range 0 to 200% Sets Set Point bias.
• • PID P Gain	♦ 1.0 Range 0 to 5 Sets Proportional Gain
• • PID I Gain	♦ 1.0 Range 0 to 15 seconds. Sets Integration Time.
• • PID D Gain	♦ 0.0 Range 0 to 100. Sets Differential Gain

• Digital

Contains parameters for digital control. **Disregard for HVAC.**

Sub-menu:	Function:
• • Dig Input Term	♦ MD0 Range MD0 to MD9
• • Dig Output Term	♦ MD0 Range MD0 to MD9
• • Dig Thermal Level	♦ 80% Range 0 to 100%.

• Analog

Contains parameters for analog control. **Disregard for HVAC**.

Sub-menu:	Function:
• • Ana Input Term	♦ MD0 Range MD0 to MD9
• • Ana Output Term	♦ MD0 Range MD0 to MD9

Contains parameters for setting communication functions when using the J-CM option board only.

• Communications

Sub-menu:	Function:
• • COMM Baud Rate	♦ 600 bps Range 300 to 19600 baud
• • COMM Station Num	♦ 1 Sets the inverters address from 1 to 32
• • COMM Data Bits	♦ 8 Sets the transfer bit length
• • COMM Parity (yes/no)	♦ ON Sets comm parity bit on or off
• • COMM Parity (even/odd)	♦ EVEN Sets parity bit even or odd
• • COMM Stop Bits	♦ 2 Sets stop bit length 1 or 2 bit
• • COMM Test Mode	♦ OFF Sets the comm test mode

STATUS

Contains parameters displaying inverter status. Including terminal status, monitor values, and inverter identification. These sub-menus's are primarily for informational purposes and are not meant to have any programming significance.

• P/S Selection

Sub-menu:	Function:
	♦ Primary. Displays current set of data being used. Either primary set or second.

• Operation Status

Sub-menu:	Function:
• • Status 1	
• • Status 2	
• • Status 3	

• Terminal Status

Displays status of input terminals 1 through 4 and output terminal status. A 1 or H indicates terminal is active.

Sub-menu:	Function:
• • Terminal I/O Status	HLLLLLLLL Status of terminals FW,8,7,6,5,4,3,2,1
• • Input Term Info 1	Status of Terminal 1
• • Input Term Info 2	Status of Terminal 2
• • Input Term Info 3	Status of Terminal 3
• • Input Term Info 4	Status of Terminal 4
• • Output Term Info	

• Monitor Values

Displays status of Monitored Values.

Sub-menu:	Function:
• • OPE Freq Set.	Displays frequency set via operator keypad. Local speed ref value.
• • TRM Freq Set.	Displays frequency set via terminal. External speed ref value.
• • OP1 Freq Set	Displays frequency if set by option card 1.
• • OP2 Freq Set	Displays frequency if set by option card 2.
• • Preset Freq	Displays frequency set in Hand mode or Local speed ref value.
• • Current Freq	Displays current inverter output frequency.
• • Freq Multiplier	♦ 1.0 Sets the scaled output frequency to be monitored.
• • Scaled Freq.	Displays the scaled output frequency.
• • Rotation Dir.	Displays the rotation direction of the motor.
• • Mot Poles – rpm	♦ 4P Sets the motor poles for display and auto tuning use. 2,4,6,8 poles.
• • Rotation Speed	Displays scaled RPM monitor value.
• • Output Cur (A)	Displays measured output amps of the inverter.
• • Output Cur (%)	Dispalys a % of the measure output amps of the inverter.
• • Output Torque	Displays a calculated value of the motor torque in percent.
• • P-N Voltage	Displays the DC bus voltage in the inverter.
• • Input Voltage	Displays the Input Voltage to the inverter.
• • kW Power	Displays the calculated kW.
• • kW Hours	Displays the calculated kW Hours.
• • kW Ratio	Displays the kW ratio.
• • Total Svc Time	Displays the total service time in seconds.Time which the drive has been powered up.

• Inverter Setup

Displays the inverter identification type and model.

Sub-menu:	Function:
• • Country Code	♦ USA
• • Model Code	Displays inverter model size. 055 to 1100 or a KW rating
• • Voltage Class	Displays inverter voltage class 200 or 400V

TRIPS

Contains parameters, which show the trip history and trip information stored in the inverter. This information is useful when troubleshooting an inverter.

Sub-menu:	Function:
• Warning	Displays current warning status.
• Total # of Trips	Displays total number of trips which have occurred.
• Cur. Trip Factor	Displays current cause of trip.
• Trip Factor 1	Displays the most recent trip cause.
• Tripping Freq 1	Displays the frequency at which the most recent trip occurred.
• Tripping Cur 1	Displays the current at which the most recent trip occurred.
• Tripping P-N V 1	Displays the DC Bus at which the most recent trip occurred at.
• Days at Trip 1	Dispalys how many days at trip condition.

Trip 2 and 3 store a history of the second and third trip data. The history log only store three trip events as they occur in sequence the history log gets updated.

- Trip Factor 2
- Tripping Freq 2
- Tripping Cur 2
- Tripping P-N V 2
- Days at Trip 2
- Trip Factor 3
- Tripping Freq 3
- Tripping Cur 3
- Tripping P-N V 3
- Days at Trip 3

NETWORK CONTROL

This parameter enables or disables the use of a serial communication network.

DEBUG MODE

Only used for special factory settings and re-initialization of the drive software. Do not alter data.

Sub-menu:	Function:
• Debug	AA000-0000 or some special code.

EDIT MODE

Used to change the EZ Pad operating firmware and parameters using a serial port link between the keypad and a computer. This mode should not be activated unless changes to firmware are required. If by accident you enter the Edit mode and the display reads: "Waiting for PC…. Press MODE key for Edit menu " Simply press the MODE key and scroll down to " Run Mode" press the Store/Enter key and the keypad will re-boot.

RESET KW HOURS

The KW hour log will be reset back to zero if the Enter key is pressed.

DOP MODE

This will place the inverter in the DOP format of programming. Do not use this mode. To escape from this mode, hold down the MODE key until the inverter returns to the monitor mode or normal operation.

OTHER MODES

READ / WRITE

This function enables the EZ Pad to upload or download parameters to another inverter. After the set up of parameters is complete, go to the Read/Write menu and select "Write EEPROM Data" this will download the parameters from the RAM memory in the inverter to the EEPROM memory in the inverter. This procedure should be done after the inverter has been programmed with the desired parameter changes. By "Writing to EEPROM" you will insure that the inverter's EEPROM will contain the proper program parameters.

To copy the contents of one inverter's parameters to another go to the Read/Write Menu and select " Read EEPROM Data". This will upload all of the inverters parameters into the EZ Pad. You can then power down the inverter and disconnect the EZ Pad to move it to another inverter. Once it has been connected to another inverter you can simply repeat the "Write to EEPROM " procedure to copy the contents into the new drive.

MODE

The Mode key places the inverter into the edit and configuration mode. The display will show " Waiting for PC…." Press the Mode Key to enter the Edit Menu. The Mode function is typically used by the factory to change and edit the EZ Pad firmware configuration. It is not recommended to be done in the field. You must have a PC and the configuration editor software to use this feature. To escape from Edit mode, press MODE key again, scroll down to "RUN MODE", press SAVE/ENTER to return to normal operation.

• Edit Mode

Inverter Port Cfg	
Expansion Port Cfg	
Store Configuration	
Transfer Mode	Used to download firmware updates from the configuration editor.
Run Mode	Select Run Mode and press Store/Enter to return to the normal running mode. The EZ Pad will re-boot and go back to the Monitor Mode.
Diagnostic Mode	
DOP Mode	

Cross Reference

The EZ Pad keypad uses a format of programming called the "DOP format" it is referred to in the standard Hitachi manual as the "Function Mode". The Hitachi manual shows the L100 and the J300 corresponding parameter numbers. The parameter numbers listed refer to the parameters which were accessible using the **standard basic** keypad previously shipped with the drive. Some parameters listed were not accessible on the J300 inverter and are therefore listed as Function numbers.

RAM INDUSTRIES INC
CONTROL DIVISION

800-999-8183 • www.ramusa.com

RT 61 • PO BOX 629 • LEESPORT, PA 19533