AMTECH

AXPERT Eazy

High Frequency Drive

INSTRUCTION MANUAL

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PREFACE

THANK YOU for purchasing the “AMTECH ***AXPERT Eazy*** Series High Frequency Drive”.

AXPERT Eazy Series High Frequency Drive is a modern Digital Signal Processor based highly functional AC Drive for high-speed application and that is easy to use. It employs latest generation IGBT as a switching device and pwm control technique to apply commanded output to the Spindle to control the Spindle speed.

PLEASE READ THIS MANUAL THOROUGHLY before use, and keep the manual at hand for later reference. Also make sure that this manual is delivered to the final users.

The purpose of this Instruction Manual is to provide basic information on Installation, Start-up, Operational and Troubleshooting for the ***AXPERT Eazy*** Series High Frequency Drive.

WARNING

ALWAYS READ THIS MANUAL THOROUGHLY BEFORE USING THE AC Drive.

THIS AC Drive CONTAINS HIGH VOLTAGE CIRCUITS THAT MAY BE FATAL TO HUMANS. USE EXTREME CAUTION DURING INSTALLATION. MAINTENANCE MUST BE PERFORMED BY QUALIFIED TECHNICIANS, AND ALL POWER SOURCES MUST BE DISCONNECTED BEFORE ANY MAINTENANCE. SUFFICIENT NOTICE MUST BE GIVEN TO THE GENERAL OPERATORS AND WORKERS BEFORE STARTING.

• ***ELECTRIC SHOCK MAY OCCUR IF THE FOLLOWING POINTS ARE NOT OBSERVED***.

(1) DO NOT OPEN THE FRONT COVER WHILE THE POWER IS ON.

(2) A CHARGE STILL REMAINS IN THE AC DRIVE WHILE THE INDICATOR IS LIT EVEN IF THE POWER HAS BEEN TURNED OFF. DO NOT OPEN THE FRONT COVER IN THIS CASE. WAIT AT LEAST 20 MINUTES AFTER THE INDICATOR GOES OUT.

(3) DO NOT CONTACT THE ELECTRICAL CIRCUIT WHILE THE "CHARGE" LED ON THE UNIT IS LIT. PERFORM SERVICING, ETC., AFTER WAITING AT LEAST 20 MINUTES AFTER THE LAMP GOES OUT.

(4) ALWAYS GROUND THE AC Drive CASE. THE GROUNDING METHOD MUST COMPLY WITH THE LAWS OF THE COUNTRY WHERE THE AC Drive IS BEING INSTALLED.

• THE AC Drive MAY BE DESTROYED BEYOND REPAIR IF THE FOLLOWING POINTS ARE NOT OBSERVED.

(1) OPERATION WITHIN THE AC DRIVE SPECIFICATIONS.

(2) PROPER CABLE CONNECTIONS TO INPUT/OUTPUT TERMINALS.

(3) CLEANING AND ENOUGH VENTILATION TO THE AC DRIVE INTAKE/OUTTAKE PORTS.

(4) OBSERVATION OF CAUTIONS LISTED IN THIS INSTRUCTION MANUAL.

• THERE MAY BE SOURCES OF NOISE AROUND THIS AC DRIVE AND SPINDLE DRIVEN BY THIS AC DRIVE. CONSIDER THE POWER SUPPLY SYSTEM, INSTALLATION PLACE AND WIRING METHOD BEFORE INSTALLATION.

INSTALL THIS AC DRIVE AWAY FROM DEVICES THAT HANDLE MINUTE SIGNALS, SUCH AS MEDICAL EQUIPMENT IN PARTICULAR. ALSO SEPARATE THE DEVICES ELECTRICALLY, AND TAKE SUFFICIENT NOISE MEASURES.

• TAKE SUFFICIENT SAFETY MEASURES WHEN USING THIS AC Drive FOR PASSENGER TRANSPORTATION, SUCH AS IN ELEVATORS (LIFTS).

Precautions For Safety

Items to be observed to prevent physical damage or property damage and to ensure safe use of this product are noted on the product and in this instruction manual.

- Please read this instruction manual and enclosed documents before starting operation to ensure correct usage. Thoroughly understand the device, safety information and precautions before starting operation. After reading, always store this manual where it can be accessed easily.

- The safety precautions are ranked as "**DANGER**" and "**CAUTION**" in this instruction manual.

: When a dangerous situation may occur if handling is mistaken, leading to fatal or major injuries.

: When a dangerous situation may occur if handling is mistaken, leading to medium or minor injuries, or physical damage.

Note that some items described as 

may lead to major problems depending on the situation. In any case, important information that must be observed is described.

This instruction manual is written on the presumption that the user has an understanding of the AC Drive. A qualified person must do installation, operation, maintenance and inspection of this product. Even qualified persons must undergo periodic training.

Qualified refers to satisfying the following conditions.

- ✓ The person has thoroughly read and understood this instruction manual.
- ✓ The person is well versed in the installation, operation, maintenance and inspection of this product, and understands the possible dangers.
- ✓ The person is informed on matters related to starting, stopping, installation, locks and tag displays, and has been trained in the operation and remedies.
- ✓ The person has been trained on the maintenance, inspection and repairs of this product.
- ✓ The person has been trained on protective tools used to ensure safety.

KEEP SAFETY FIRST IN YOUR SYSTEM

AMTECH puts the maximum effort into making products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with AC Drive may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your system, with appropriate measures such as isolating devices, mechanical brakes, prevention against any malfunction or mishap.

CHAPTER- 1: DELIVERY, INSPECTION AND STORAGE

⚠ CAUTION

- ✓ Always transport the product with an appropriate method according to the products weight.
  Failure to observe this could lead to injuries.
- ✓ Do not place the product near inflammable items.
  Failure to observe this could lead to fires.
- ✓ Do not hold the product with front cover while transporting the product.
  Failure to observe this could lead to injuries from dropping.
- ✓ Do not let conductive materials such as screws or metal pieces and inflammable materials such as oil enter the product.
  Failure to observe this could lead to fires.
- ✓ Install the product in a place that can withstand the weight of the product, and follow the instruction manual.
  Failure to do so could lead to injuries from dropping.
- ✓ Do not install and operate an AC Drive that is damaged or that has missing parts.
  Failure to observe this could lead to injuries.
- ✓ Always observe the conditions described in the instruction manual for the installation environment.
  Failure to observe this could lead to faults.

1-1 Delivery, Inspection And Storage

AXPERT Eazy Series High Frequency Drive has gone through rigorous quality control tests at the factory before shipment. After receiving the AC drive, check for the following.

(1) Check to make sure that the package includes a High Frequency Drive and User Manual

(2) Remove the unit from packaging, and check the details on the rating nameplate to confirm that the AC Drive is as ordered.

(3) Confirm that the product has not been damaged during shipment.

The *AXPERT Eazy* Series High Frequency Drive should be kept in the shipping carton before installation. In order to retain the warranty coverage, the AC Drive should be stored properly when it is not to be used for an extended period of time. Some storage suggestions are:

(1) Store in a clean, dry location.

(2) Store within an ambient temperature range of -20°C (-4°F) to +70°C (158°F).

(3) If possible, store in an air-conditioned environment where the relative humidity is less than 95%, non-condensing.

(4) Do not store the High Frequency Drive in places where it could be exposed to corrosive gases.

(5) Do not store the High Frequency Drive on a shelf or on an unstable surface.

(6) If the High Frequency Drive is not to be used for a while (more than 2 months) after purchasing, store it in a place with no humidity or vibration in the packaged state.

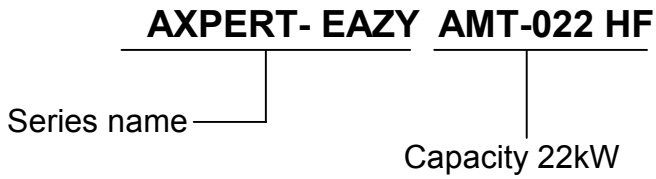
(7) Always inspect the High Frequency Drive before using after storing for a long period.

1-2 Details Of Rating Nameplate And Type Display Method

The following details are listed on the rating nameplate.

MODEL AXPERT-EAZY HF	: AMT022HF	KW: 22
INPUT AC 3-PHASE	: 380 - 460VAC,	50 / 60Hz
OUTPUT AC 3-PHASE	: 380 / 460VAC,	0.1 ~ 1800.0Hz
OUTPUT CURRENT	: 44A	
SERIAL NO	: XXXXX	
S/W VERSION	:	

Using the above type as an example, the type is displayed as follows:



CHAPTER- 2: INSTALLATION AND WIRING

This chapter provides the information needed to properly **install** and **wire** the AC Drive. Make sure that the AC Drive is wired according to the instructions contained in this chapter. The instructions should be read and understood before the actual installation begins.

⚠ CAUTION

- ✓ Install the AC Drive, dynamic braking unit and resistor, and other peripheral devices on noncombustible material such as metal.
  Failure to observe this could lead to fires.
- ✓ Do not place the product near inflammable items.
  Failure to observe this could lead to fires.
- ✓ Do not let conductive materials such as screws or metal pieces and inflammable materials such as oil enter the product.
  Failure to observe this could lead to fires.
- ✓ Install the product in a place that can withstand the weight of the product.
  Failure to do so could lead to injuries from dropping.
- ✓ Do not install and operate AC Drive that is damaged or that is missing parts.
  Failure to observe this could lead to injuries.
- ✓ Always observe the conditions described in the instruction manual for the installation environment.
  Failure to observe this could lead to faults.
- ✓ Install an overheating protection device on the dynamic braking resistor, and shut off the power with this fault signal.
  Failure to do so could lead to fires in the event of abnormal overheating.

2-1 Installation Environment

Observe the following points when installing the AC Drive.

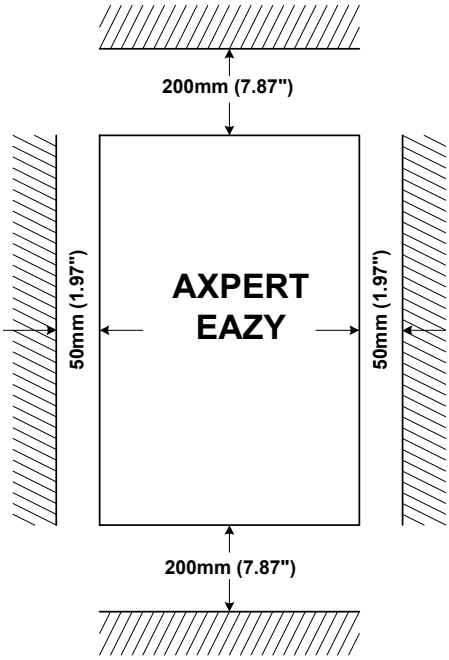
(1) Install the AC Drive vertically to provide proper ventilation.

(2) Make sure that the ambient temperature is –10°C (14°F) to 50°C (122°F).

(3) Avoid installation in the following environment.

- Places subject to direct sunlight
- Places with oil mist, dust or cotton lint, or subject to salty winds
- Places with corrosive gas, explosive gas or high humidity levels
- Places near vibration sources such as dollies or press machines
- Places made of in-flammable materials such as wood, or places that are not heat resistant

(4) Ensure ventilation space around the AC Drive as shown in the below figure.



2-2 Precautions For Power Supply And Spindle Wiring

DANGER

- Always turn the device's input power OFF before starting wiring.
  Failure to do so could lead to electric shocks or fires.
- Carry out grounding that complies with the standards of the country where the AC Drive is being installed.
  Failure to do so could lead to electric shocks or fires.
- Wiring must always be done by a qualified electrician
  Failure to observe this could lead to electric shocks or fires.
- Always install the device before starting wiring.
  Failure to do so could lead to electric shocks or injuries.
- Use circuit breaker or fuses that match with the capacity of AC Drive power supply.
  Failure to do so could lead to fires.

CAUTION

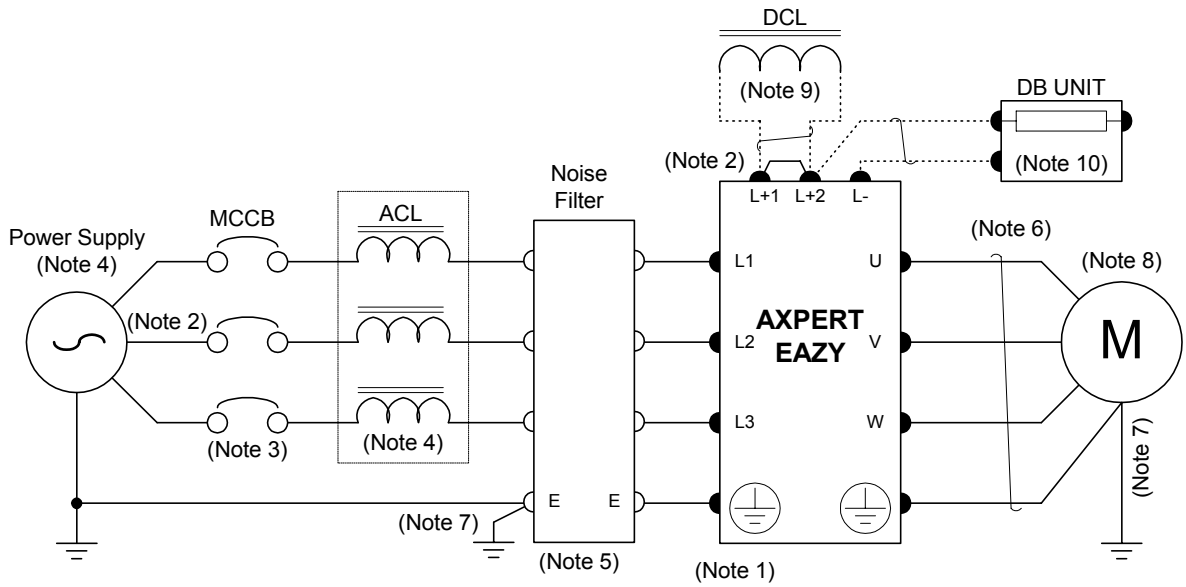
- ✓ Do not connect an AC power supply to the output terminals (U, V, W) and DC terminals (L+1, L+2, and L–).
  Failure to observe this could lead to injuries or fires.
- ✓ Confirm that the product's rated input voltage and frequency match the power supply voltage and frequency.
  Failure to do so could lead to injuries or fires.
- ✓ Install an overheating protection device on the dynamic braking resistor, and shut off the power with this fault signal.
  Failure to do so could lead to fires in the event of abnormal overheating.
- ✓ Do not directly connect a resistor to the DC terminals (L+1, L+2, and L–).
  Failure to observe this could lead to fires.
- ✓ Tighten the terminal screws with the designated tightening torque.
  Failure to do so could lead to fires.
- ✓ Correctly connect the output (U, V, W) to Spindle terminals to ensure proper phase sequence.
  Failure to do so could cause the Spindle to rotate in reverse and the machine to be damaged.

Refer to below figure and wire the main circuits for the power supply and Spindle, etc.
Always observe the following precautions for wiring.

CAUTION

There is a risk of electric shocks.
The AC Drive has a built-in electrolytic capacitor, so a charge will remain even when the AC Drive power is turned off. Always observe the following items before carrying out the wiring work.

- ✓ Wait at least 20 minutes after turning the power off before starting work. Make sure that the displays on the Digital Operation Panel have gone out before removing the cover.
- ✓ After removing the cover, confirm that the “DC BUS CHARGE LED“ in the unit on bleeder board has gone out. Also check that the voltage between terminals L+1 or L+2 and L- is 15V or less before starting the inspections.



EXAMPLE OF MAIN CIRCUIT WIRING

(Note 1) AC Drive input / output terminals

The AC Drive input terminals are L1, L2 & L3. The output terminals to the Spindle are U, V & W. Connect the power supply to input terminals L1, L2 & L3 only. Never connect the power supply to the U, V, and W terminals. Incorrect wiring will lead to AC Drive damage or fires.

(Note 2) Wire size

Use wires having the size (or larger) shown in the below table for the main circuit wiring shown in the above figure. The applicable wire size range, applicable ring terminal and tightening torque for the main circuit terminals are shown in the table.

AXPERT Eazy AMT-□□□HF		**1P5**	**2P2**	**4P0**	**5P5**	**7P5**	**011**	**015**	**018**	**022**	**030**	**037**
Rated Capacity	**kW**	1.5	2.2	4.0	5.5	7.5	11	15	18	22	30	37
	Hp	2.0	3.0	5.0	7.5	10	15	20	25	30	40	50
Rated Current (A)		3.6	5.5	8.6	13	17	23	31	37	44	60	73
Applicable Spindle kW		1.5	2.2	4.0	5.5	7.5	11	15	18	22	30	37
Applicable wire for Input / Output	mm^2	0.8	0.8	2	3.5	5.5	5.5	8	14	14	35	35
	AWG	18	18	14	12	10	10	8	6	6	2	2

(Note 3) Breaker for wiring

Install circuit breaker or fuse on the power supply side of the AC Drive. Refer to table and select the Circuit Breaker or Fuses.

(Note 4) Power supply capacity

Make sure that the capacity of the transformer used as the AC Drive's power supply is 10 times (or less) AC Drive capacity (for 4% impedance transformer). If the above value is exceeded or multiple drives are being fed from the same line with only the wiring impedance between them, install an ACL on the AC Drive's input side.

If improperly sized, the voltage drop on a line reactor can reduce the voltage on drive terminals especially at high load. In that case the Spindle current will also increase and DC Bus under voltage fault may occur.

(Note 5) Noise filter

The AC Drive will generate high harmonic electromagnetic noise, so using the following noise measures is recommended.

- Insert a noise filter on the input side of the AC Drive. Contact Amtech to select the proper noise filter.
- Keep the wiring length between the noise filter and AC Drive to 500 mm (19.69") or less.
- Use a shield cable for the AC Drive and Spindle wiring and connect the screen to the AC Drive's ⏚ terminal.
- When using the control circuit wiring and power circuit wiring in parallel, separate the wiring by 300mm (11.8") or more or pass each of the wiring through separate metal conduits. If the control circuit wiring and main circuit wiring intersect, make sure that they intersect at a right angle.

(Note 6) AC Drive output

Do not insert a power factor improvement capacitor on the output side of the AC Drive. When inserting a magnetic contactor on the output side of the AC Drive, prepare a sequence control circuit so that the magnetic contactor will not open and close when the AC Drive is running.

(Note 7) Grounding

Always ground the AC Drive unit according to the regulations of the country where the AC Drive is being used.

(Note 8) AC Drive output surge voltage

As the AC Drive output cable is lengthened, the surge voltage applied on the Spindle also increases. If the wiring between the AC Drive and Spindle exceeds 20 meters (65.6"), connect a surge absorber dedicated for the AC Drive output.

(Note 9) DCL

Always short across L+1 and L+2 when not using the DCL (factory setting state). When connecting the optional DCL, connect it to L+1 and L+2. Twist the wiring to the DCL, and keep the wiring length to 5 meters (16.4") or less.

(Note 10) DB Unit

When connecting an optional DB unit, make the connections as shown in the main circuit wiring. The DB unit and AC Drive unit will damage if the connections are incorrect. Twist the wiring to the DB unit, and keep length to 3 meters (9.8") or less.

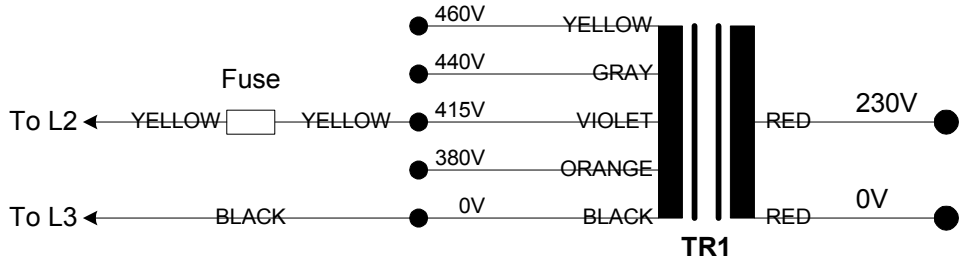
When using the external DB unit, use the overload detection relay or thermal relay to protect the DB resistor and AC Drive.

(Note 11) Surge absorber

Install a surge absorber on the magnetic contactor and relay coils installed near the AC Drive.

(Note 12) Voltage Selection for the auxiliary equipment Power Supply (Applicable to models above 22kW)

Ensure appropriate tapping for the control transformer, which provides the power supply to the auxiliary equipments like fan/blower, soft charge contactor etc. Note that this not applicable to the models up to 22kW.



(Note 13) Output Transformer

Output transformer must be custom designed for each drive and required voltage frequency of Spindle. If the output transformer is not properly sized, drive and/or spindle may damage.

- In high frequency application when spindle voltage is significantly lower (360V) than the line voltage available.
- For increasing the output current without increasing the drive current rating (output voltage reduction).

2-3 Precautions For Wiring To Control Signals

- ✓ When wiring (control circuit wiring) to the control terminal block, separate the main circuit wiring (terminals L1, L2, L3, L+1, L+2, L-, U, V, W) and the other drive wires and power wires.
- ✓ Use a 0.13mm^2 (AWG 26) to 0.8mm² (AWG 18) wire for wiring to the control circuit. The tightening torque must be 0.6N.m (5.3lb-inch).
- ✓ Use a twisted pair wire or twisted pair shield wire for wiring to the analog signal circuit such as the analog references and meters. Connect the shield wire to the 0V terminal of the unit. The wire length must be 30 meters (98.4”) or less.
- ✓ The length of the sequence input/output contact wire must be 50 meters (164”) or less.
- ✓ The sequence input can be changed between sink logic and source logic by changing the jumper position JP1 in PCA-2014A between “SINK” and “SOURCE” position respectively. Open cover designated as “Control Unit” to access this jumper.
- ✓ Observe the precautions listed in “**5. Control Input/Output Terminals**”
- ✓ After wiring, always check the mutual wiring.
- ✓ At this time do not carry out a megger check or buzzer check on the control circuit.

  • Are there any wire scraps or foreign matter left around the terminals?
  • Are any screws loose?
  • Is the wiring correct?
  • Is any terminal contacting any other terminal?

If so, take the necessary corrective measures before proceeding further.

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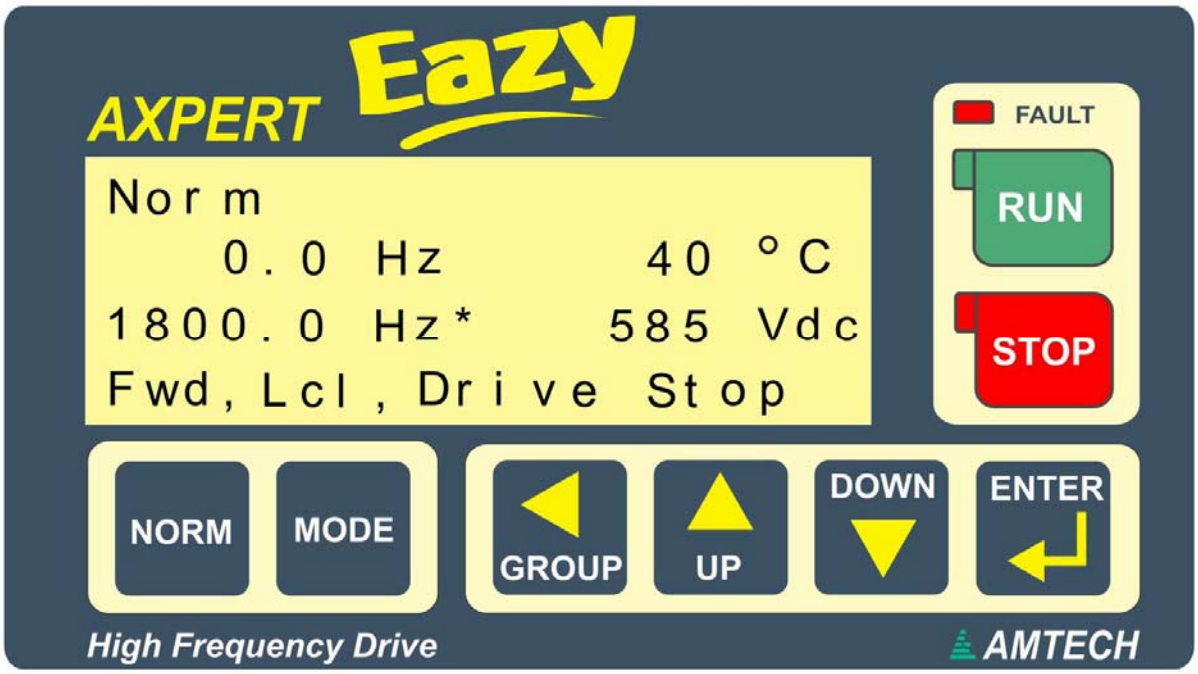
CHAPTER- 3: DIGITAL OPERATION PANEL (LCD KEYPAD MODULE)



The configuration of the Digital Operation Panel is shown in the below figure. The structure of it is as shown below.

The Digital Operation Panel is equipped with 8-keys as shown in the above figure. The function of each key is described below.

This key is utilized to reach to the normal screen of digital operator panel from any parameter, group or mode. The normal screen displays different parameters and status. This is the screen displayed at power on.

This key when pressed, passes the control to next successive modes i.e. NORM (Normal), MODE-M (Monitor), MODE-A, MODE-B, MODE-C, MODE-D & Meter mode. After the end of all modes, it will carry the control again to first mode. When changing the mode, the last accessed parameter of last accessed group of successive mode will be displayed.

This key passes the control to next group in the same mode. The groups can be accessed only in the incremental direction. At last it will again come to the first group.

These keys are used to change parameter numbers & parameter value. When ENTER key is pressed, these keys are used to change the parameter value, otherwise it is used to navigate the parameters in upward / downward direction in the group.

This key is used to change and save the parameter value. When pressed first time, it will allow the user to change the parameter value using up and down keys. Once the desired value is set, it is pressed again to save the change value. Press NORM key instead of ENTER, to discard the change.

This key is used to start the AC Drive when the start control is through Digital Operation Panel. The key is equipped with the status indicating LED. It will glow, when the AC Drive is running.

This key is used to stop the AC Drive irrespective of the start control source. It is also used to reset the fault. The stop key is equipped with status indicating LED. It will glow when the AC Drive is off.

The Digital Operation Panel is also equipped with the fault indicating LED. It will flash in the fault condition. It is also equipped with four lines, 20-character LCD display for the user-friendly parameter navigation, monitoring and setting.

In the normal condition the screen will be as below.

User Selectable four parameters

	N	o	r	m															
Norm 1 →			0	.	0		H	z						0	.	0		A	m	p
Norm 2 →		5	0	.	0		H	z	*					0	0			%	L	
	F	w	d	,	L	c	l	,	D	r	i	v	e		S	t	o	p		

← Norm 3

← Norm 4

Spindle Direction

F	w	d
R	e	v

Start Select

L	c	l
T	m	l
S	r	l

Drive Status

*	*		F	a	u	l	t		*	*	
E	m	r	g	n	c	y		S	t	o	p
G	a	p		E	l	i	m	i		O	n
S	t	a	r	t		D	e	l	a	y	
J	o	g	g	i	n	g					
A	u	t	o		R	e	s	t	a	r	t
C	u	r	r	e	n	t		L	m	t	
V	o	l	t	a	g	e		L	m	t	
S	p	e	e	d		S	e	a	r	c	h
P	L	C	T		A	c	t	i	v	e	
N	o	r	m	a	l		R	u	n		
A	c	c	e	l	e	r	a	t	i	o	n
D	e	c	e	l	e	r	a	t	i	o	n
D	C		B	r	e	a	k	i	n	g	
D	r	i	v	e		S	t	o	p		
M	a	i	n	s		O	n				

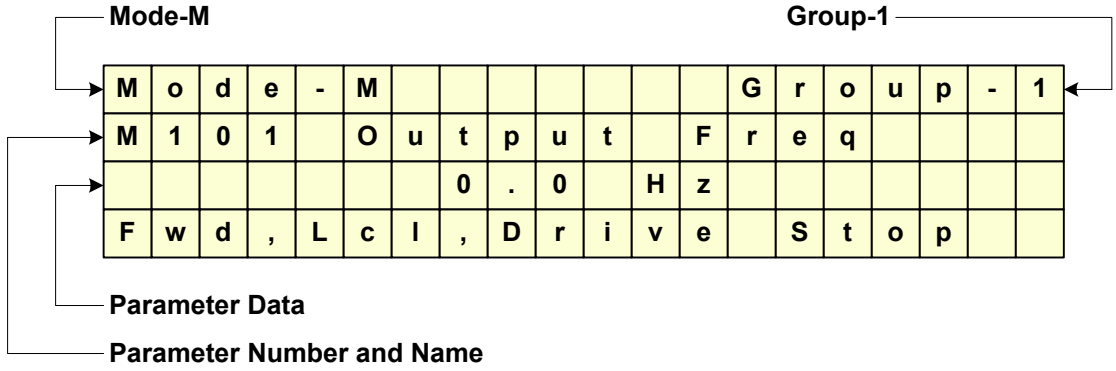
The above figure also indicates the selected direction of rotation, start selection and drive status. The four user selectable parameters can be configured using A601 ~ A604.

3- 1 Drive Status

The fourth line of the Digital Operation Panel (LCD Keypad Module) is used to display different status of the unit as shown above**.** More than one status can exist at one time. In this case, the status having higher priority will be displayed. The priority is as shown in the figure. Fault has the highest priority and mains on have least priority.

NO	NAME	DESCRIPTION
1	*Fault*	It indicates that some fault has occurred in the unit.
2	*Emergency Stop*	It shows that the unit is stopped due to emergency stop command.
3	*Gap Elimi On*	It shows gap eliminator output is on.
4	*Start Delay*	It shows that the start is delayed by the programmed start delay.
5	*Jogging*	It shows that the jog select input is active and present operation is jogging.
6	*Auto Restart*	It shows that auto restart function is in operation.
7	*Current Limit*	It shows that the current limit function is active.
8	*Voltage Limit*	It shows that the dc bus voltage control function is active.
9	*Speed Search*	It shows that the speed search operation is in progress.
10	*PLCT Active*	It shows that the Power-Loss-Carry-Through function is in progress.
11	*Normal Run*	It shows that ramp up / down action is over and unit is running in normal condition.
12	*Acceleration*	It shows that the unit is accelerating to the set speed.
13	*Deceleration*	It shows that the unit is decelerating.
14	*DC Breaking*	It shows that the dc breaking is active.
15	*Drive Stop*	It shows that the AC Drive is in stop condition.
16	*Mains On*	It shows that the mains power supply is on.

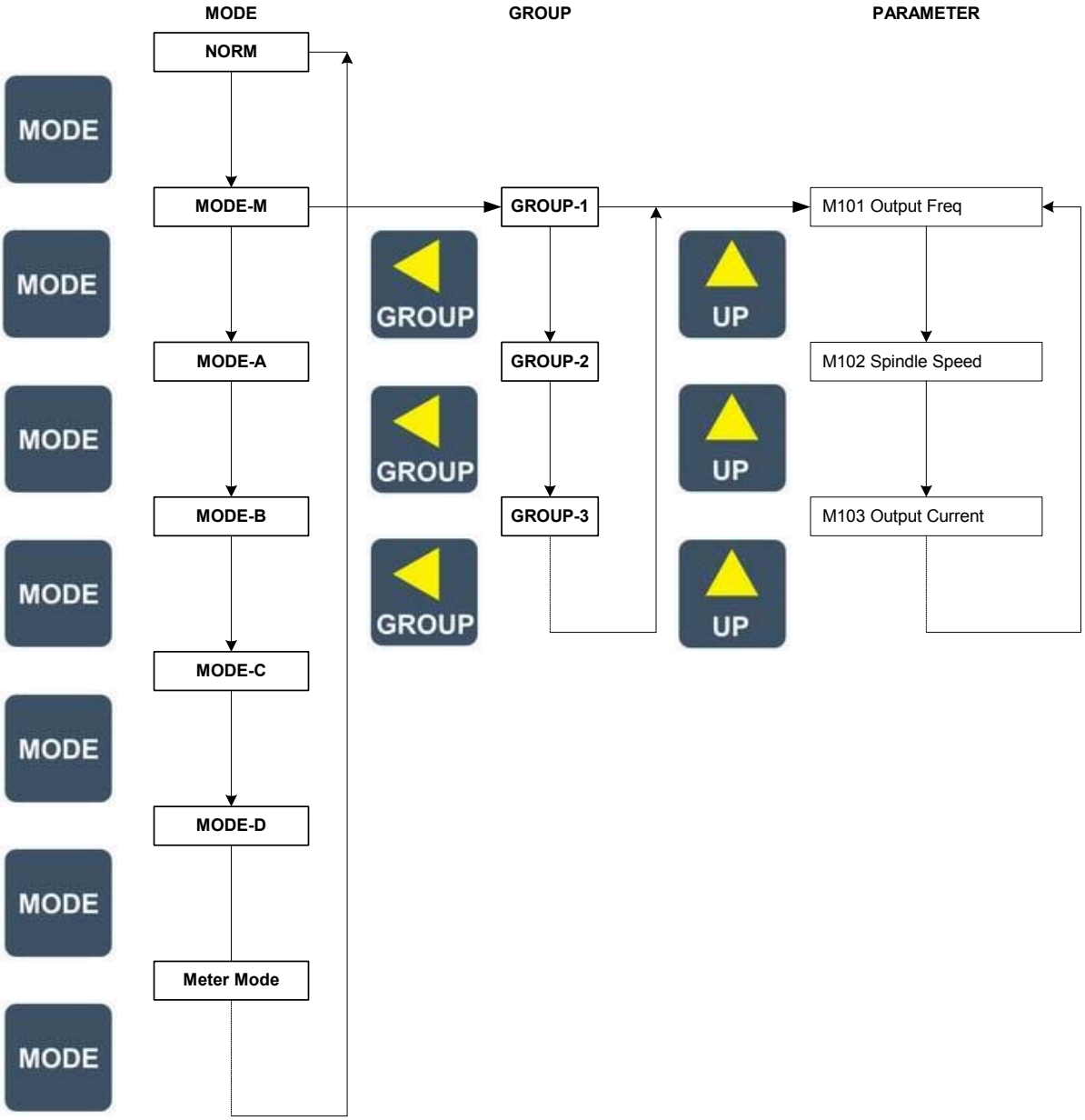
When first time MODE key is pressed, lastly accessed parameter of lastly accessed group of Mode-M will appear with its data. Below figure shows the parameter M101 of Group-1 of Mode-M.



The first line indicates the present mode and group. The second line indicates the parameter number with its name and the third line shows its value. The fourth line shows the present status and remains all the time except fault condition, contact information and fault history.

3-2 Modes & Parameters

The parameters are grouped into Modes and Groups according to their functions.
The configuration of the parameters is as under.



CAUTION

✓ Do not remove or insert the display cable between PCA-2014A (Main Control Card) and PCA-2012 (Display Card) in power-energized condition.
Failure to observe this could lead to component failure and tripping of the unit.

CHAPTER- 4: TEST OPERATION AND ADJUSTMENT

DANGER

- Always install the front cover before turning the input power ON. Never remove the cover while the power is ON. There are sections in the front PCB that are charged with high voltages.
  Failure to observe this could lead to electric shocks.
- Never touch the switches with wet hands.
  Failure to observe this could lead to electric shocks.
- Never touch the AC Drive's terminals while the AC Drive power is ON even if the operation is stopped.
  Failure to observe this could lead to electric shocks.
- Selection of the restart function could lead to unexpected restarting when a fault occurs. The machine may start suddenly if the power is turned ON, if the run command is present. Do not go near the machine.
  (Design the machine so that physical safety can be ensured even if the machine restarts.)
  Failure to do so could lead to injuries.
- The machine may not stop according to the set deceleration time when a stop command is issued if the ramp down to stop function is selected and the voltage / current limit function is activated. Prepare a separate emergency stop switch in such cases.
  Failure to do so could lead to injuries.
- Resetting of a fault while the run signal is input could lead to restarting. Always confirm that the run signal is OFF before resetting the fault.
  Failure to do so could lead to injuries.

CAUTION

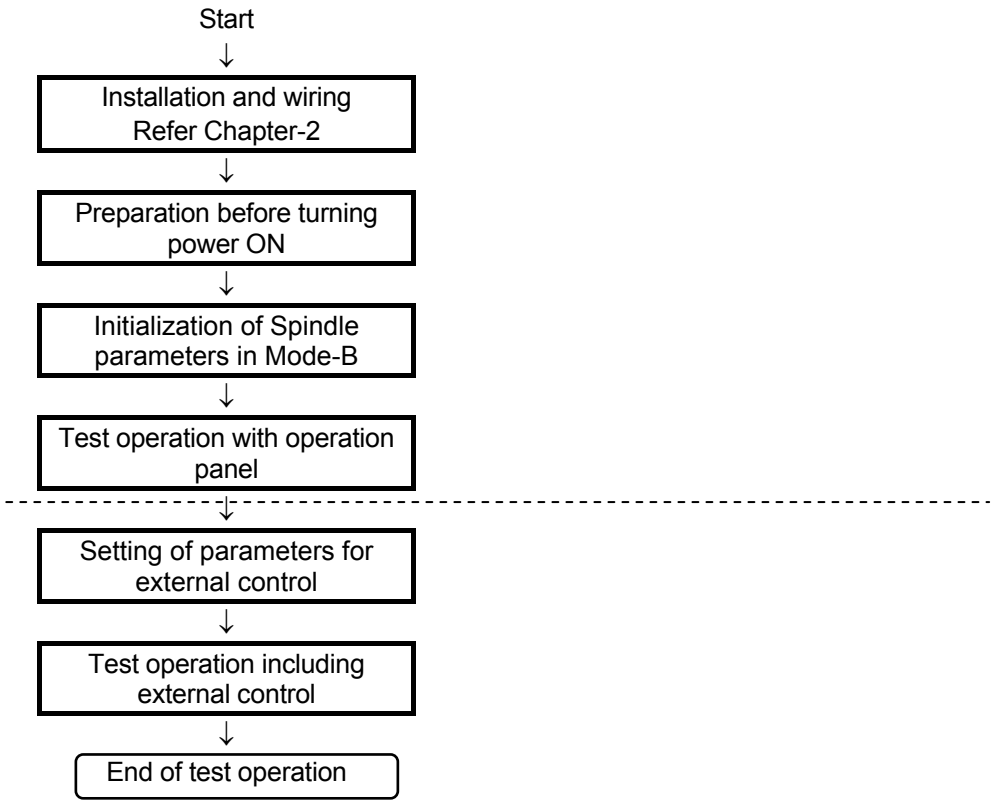
- ✓ The heat sink, chokes and dynamic braking resistor are heated to high temperatures, so never touch them.
  Failure to observe this could lead to burns.
- ✓ Do not block the AC Drive's ventilation holes.
  Failure to observe this could lead to fires.
- ✓ The AC Drive operation can easily be set from low speeds to high speeds, so confirm that the operation is within the tolerable range for the Spindle or machine before making settings.
  Failure to do so could lead to injuries.
- ✓ Prepare holding brakes when necessary. Holding is not possible with the AC Drive's brake functions.
  Failure to do so could lead to injuries.
- ✓ Confirm the operation of the Spindle as a single unit before operating the machine.
  Failure to do so could lead to injuries or machine damage due to unforeseen movements.
- ✓ Always prepare a safety backup device so that the machine is not placed in a hazardous situation when an error occurs in the AC Drive.
  Failure to do so could lead to injuries or machine damage or fires.

The Axpert Eazy HF Series AC Drive has various setting items. Some of these include settings that must be made according to the power supply and Spindle before actually starting the operation.

The method of the basic operation is explained in this section.

Carry out test operation according to the flow shown below

The procedures above the dotted line in the below fig are explained in this section.



4-1 Preparation before turning power ON

Always confirm the following points before turning ON the power after completing wire.

(1) Remove the coupling and belt coupling the Spindle and machine, so that the machine can be run as a single unit.

(2) Confirm that the power supply cables are correctly connected to the input terminals (L1, L2, and L3).

(3) There are some sections in the inverter, which operate with an AC power supply, such as fan/blower and magnetic contactor. In this case, select the appropriate tapping of the control transformer on the control terminal block inside the unit. Remove the front cover to access the control terminal block.

(4) Make sure that the power voltage and frequency is within the tolerable range.

(5) Refer to Chapter-2: Installation & Wiring and correctly connect the main circuit wiring.

(6) Securely fix the Spindle with the specified method.

(7) Make sure that none of the terminal section screws are loose.

(8) Make sure that there is no short circuit state in the terminals caused by wire scraps, etc.

(9) Always correctly install the front cover and outer cover before turning the power ON.

(10) Assign an operator, and make sure that the operator operates the switches.

Make sure that there is no abnormal noise, smoke or odors at this time. If any abnormality is found, turn the power OFF immediately.

4-1-1 Selection of Start Control

The Axpert Eazy HF Drive can be controlled from various places like Digital Operation Panel (Local), Terminal or from PC. Select appropriate start control in A301. Use Digital Operation Panel (Local) during the test operation.

A301: Start Control
- =1: Local
- =2: Terminal
- =3: Serial

4-1-2 Selection of Frequency Reference Input

The Axpert Eazy AC Drive accepts frequency reference from various places like Digital Operation Panel (Local), Terminal or from PC. Select appropriate frequency reference input in A106. Use Digital Operation Panel (Local) during the test operation.

A106: Frequency Reference Input
- =1: Local (Digital Operation Panel)
- =2: FSV 0-10V
- =3: FSI 4-20mA
- =4: FSV 0-5V
- =5: FSI 0-20mA
- =6: FSV 10-0V
- =7: FSI 20-4mA
- =8: FSV 5-0V
- =9: FSI 20-0mA
- =10: Static pot
- =11: Serial
- =12: PID Output
- =13: IIN 4-20mA

Refer the diagram of selection process of frequency reference diagram for the better understanding of the flow frequency reference signal priorities.

4-1-3 Output Transformer Selections

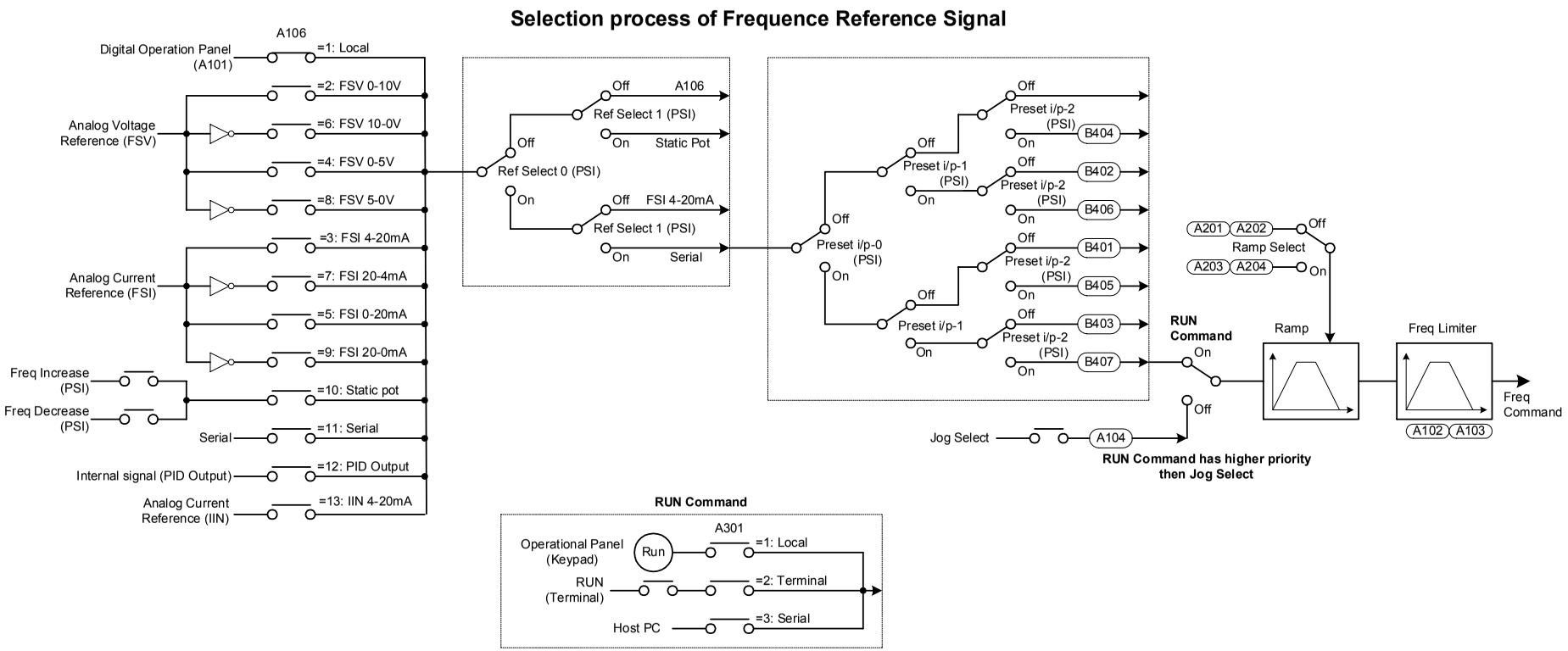
Output transformer must be custom designed for each drive and the required voltage/frequency of the spindle. If the output transformer is not properly sized, drive and / or spindle damage may result.

Output transformer is required when spindle voltage is significantly lower than the line voltage.

4-2 Initialization of Spindle parameters in Mode-B

Input the Spindle rating parameters. Set the following parameters in Mode-B.

B101: Rated Input Voltage (V)
B102: Spindle Voltage (V)
B103: Spindle Current (A)
B104: Spindle Frequency (Hz)
B105: Spindle Speed (KRPM)
B106: Spindle Output (kW)
B107: Spindle Poles


Selection process of Frequence Reference Signal
A106
Digital Operation Panel (A101)
=1: Local
=2: FSV 0-10V
Analog Voltage Reference (FSV)
=6: FSV 10-0V
=4: FSV 0-5V
=8: FSV 5-0V
=3: FSI 4-20mA
Analog Current Reference (FSI)
=7: FSI 20-4mA
=5: FSI 0-20mA
=9: FSI 20-0mA
Freq Increase (PSI)
Freq Decrease (PSI)
=10: Static pot
Serial
=11: Serial
Internal signal (PID Output)
=12: PID Output
Analog Current Reference (IIN)
=13: IIN 4-20mA
Off
Ref Select 0 (PSI)
On
Off
A106
Ref Select 1 (PSI)
On
Static Pot
Off
FSI 4-20mA
Ref Select 1 (PSI)
On
Serial
Off
Preset i/p-0 (PSI)
On
Off
Preset i/p-1 (PSI)
On
Off
Preset i/p-1
On
Off
Preset i/p-2 (PSI)
On
B404
Off
Preset i/p-2 (PSI)
On
B402
Off
Preset i/p-2 (PSI)
On
B406
Off
Preset i/p-2 (PSI)
On
B401
Off
Preset i/p-2 (PSI)
On
B405
Off
Preset i/p-2 (PSI)
On
B403
Off
Preset i/p-2 (PSI)
On
B407
RUN Command
On
Off
Jog Select
A104
RUN Command has higher priority then Jog Select
A201
A202
Off
Ramp Select
A203
A204
On
Ramp
Freq Limiter
A102
A103
Freq Command
RUN Command
A301
Operational Panel (Keypad)
Run
=1: Local
RUN (Terminal)
=2: Terminal
Host PC
=3: Serial

4-3 Test operations

When finished with above steps, test run the isolated Spindle, and make sure that there are no errors.

Use Digital Operation Panel mode to test run the Spindle. Initially set 10.0Hz and press “RUN” key to start the Spindle.

Check

- Did the Spindle run?

- Is the run direction correct? Check the wiring and operation if abnormal.

- Is the rotation smooth?

Select “REVERSE” direction in ‘A305: Spindle Direction’ and Press “RUN” and confirm that the Spindle runs normal in reverse direction.

(Note) Do not carry out this step if a load, which cannot be run in reverse, is connected.

Press the “STOP” key and stop the Spindle.

Now, again set the “FORWARD” direction win ‘A305: Spindle Direction’ and increase the frequency to 50Hz.

This completes the test operation with the operation panel.

After this, carry out the parameter settings and adjust the load operation to match the user's application.

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