Encoder Interface Modules User Guide

Safety Informations

This option is specifically designed to be used with the HPVFP variable speed drive product range and is intended for professional incorporation into complete equipment or systems. If installed incorrectly it may present a safety hazard. The HPVFP uses high voltages and currents, carries a high level of stored electrical energy, and is used to control mechanical plant that may cause injury. Close attention is required to system design and electrical installation to avoid hazards in either normal operation or in the event of equipment malfunction.

System design, installation, commissioning and maintenance must be carried out only by personnel who have the necessary training and experience. They must read carefully this safety information and the instructions in this Guide and follow all information regarding transport, storage, installation and use of the option module, including the specified environmental limitations.

Please read the **SAFETY NOTICE** carefully, and all **Warning** and **Caution** boxes elsewhere.

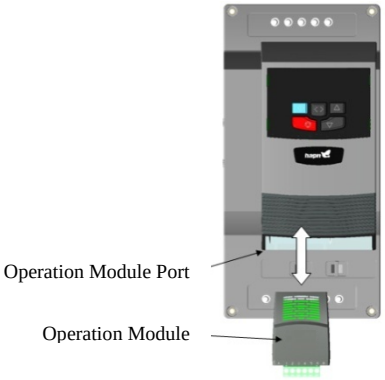
⚠ **Caution**	Store the HPVFP Option Module in its box until required. It should be stored in a clean and dry environment. Temperature range –40℃to +60℃. Install the Option Module into the HPVFP by inserting the module into the option module port of the HPVFP as shown in the mechanical installation section. Do not use undue force in inserting the option module into the port.
⚠ **Warning**	HPVFP and the Option Modules should be installed only by qualified electrical persons and in accordance with local and national regulations and codes of practice.
⚠ **Electric Shock Hazard**	Disconnect and isolate the HPVFP before attempting any work on it. High voltages are present at the terminals and within the drive for up to 10 minutes after disconnection of the electrical supply. Where the electrical supply to the drive is through a plug and socket connector, do not disconnect until 10 minutes have elapsed after turning off the supply.

Specification

Compatibility	HPVFP series drive
Compatible Encoder Type	5V TTL – A & B Channel
	24V HTL – A & B Channel
	Note: +24V HTL encoder requires external supply voltage
Power Supply Output	5V DC at 200mA Max
Maximum Input Frequency	500kHz
Maximum Input Voltage	30V DC
Protection Class	IP20
Environmental	-10℃ ~ +50℃
Terminal Torque	0.5N.m (4.5 I_b-in)

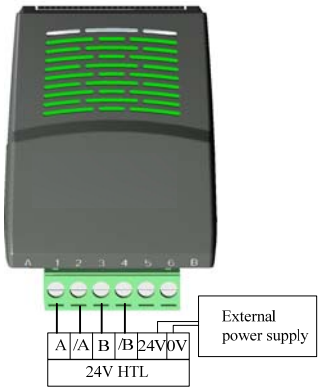
Mechanical Installation

1) Option Module inserted into HPVFP Option Module Port.
2) Do not use undue force in inserting the option module into the options port.
3) Ensure the option module is fitted securely before powering on the HPVFP.
4) Remove terminal block header from option module prior to tightening connections. Replace when wiring is completed. Tighten to torque setting provided in specifications.



1. Option Module Connection Terminals

pin	function
1	A channel（A+）
2	A channel inverse（A-）
3	B channel（B+）
4	B channel inverse（B-）
5	+5V DC output
6	0V COM

Connection Example – 5V TTL Encoder	Connection Example – 24V HTL Encoder
	

Note:24V HTL encoder must provide external +24V power supply.

Operation

Parameter Settings

When operating with an encoder, the following parameter settings are required as a minimum:

- P1-09: Motor rated frequency (found on the motor nameplate).
- P1-10: Motor rated speed (found on the motor nameplate).
- P6-06: Encoder PPR value (enter value for the connected encoder).

Closed Loop Vector Speed provides full torque holding capability at zero speed and enhanced operation at frequencies below 1Hz. The drive, encoder module and encoder should be connected according to the voltage rating of the encoder as shown in the wiring diagrams.

The encoder cable should be an overall shielded type, with the shield bonded to earth at both ends.

Commissioning

When commissioning, the HPVFP should firstly be commissioned in Encoderless Vector Speed Control (P6-05 =0) , and a speed / polarity check should then be made to ensure that the sign of the feedback signal matches that of the speed reference in the drive. The steps below show the suggested commissioning sequence, assuming the encoder is correctly connected to the HPVFP.

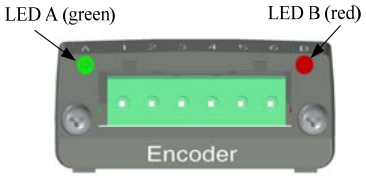
1) Enter the following parameters from the motor nameplate:
   - P1-07 – Motor Rated Voltage
   - P1-08 – Motor Rated Current
   - P1-09 – Motor Rated Frequency
   - P1-10 – Motor Rated Speed
2) To enable access to the advanced parameters required, set P1-14 = 201.
3) Select Vector Speed Control Mode by setting P4-01 = 0.
4) Carry out an Auto-tune by setting P4-02 = 1.
5) Once the Auto-tune is completed, the HPVFP should be run in the forward direction with a low speed reference (e.g. 2 – 5Hz). Ensure the motor operates correctly and smoothly.
6) Check the encoder feedback value in P0-58. With the HPVFP running in the forward direction, the value should be positive, and stable with variation of ±5% maximum. If the value in this parameter is positive, the encoder wiring is correct. If the value is negative, the speed feedback is inverted. To correct this, reverse the A and B signal channels from the encoder.
7) Varying the drive output speed should then result in the value of P0-58 changing to reflect the change of the actual motor speed. If this is not the case, check the wiring of the whole system.
8) If the above check is passed, the feedback control function can be enabled by setting P6-05 to 1.

Error Code Definitions

The following error codes are related to the encoder operation:

Code	Description	Solution
Enc-01	Communication Loss	No communication between the encoder module and the drive. Please check the module is properly fitted into the slot.
Enc-02	Speed Feedback Error Exceeds Level set in P6-07	The estimated motor speed differs from the measured motor speed. Check encoder connection, wire shielding, and values set in P6-07.
Enc-03	Encoder PPR motor speed mismatch	The encoder used must have a PPR value of at least 60. Motor nameplate RPM must be entered in P1-10.
Enc-04	Encoder Channel A Fault	Error normally caused by encoder wiring error. Check encoder wiring and commissioning guidelines.
Enc-05	Encoder Channel B Fault	
Enc-06	Encoder Channels A & B Faults	

Led Status Indication



The encoder module has 2 LEDs – LED A (Green) and LED B (Red).

LED A indicates power .

LED B indicates a wiring fault condition.

The fault code is indicated on the drive display as noted above. For transient faults, the LED will remain illuminated for 50ms to ensure that fast transient faults can be observed.