

HiPASS BYPASS SYSTEMS

Your Energy Cost Savings Solution

AC Drive Bypass Systems
designed for:

- Fans and Pumps
- Rooftop Air Handlers
- Cooling Towers
and Similar Applications



HiPASS BYPASS SYSTEMS

With energy comprising more and more of your building costs, the use of variable frequency drives (VFDs) to control the speed of fans and pumps is your logical solution. Retrofit applications are looking to VFDs to help reduce their energy costs.

The use of Variable Frequency Drives will provide additional benefits, such as:

- Reduction of maintenance costs versus a mechanical system
- Reduction of stress on motors during start up
- Accurate control of temperature and flow
- Reduction of system mechanical noise

Figures 1 and 2 illustrate the energy savings for fans and pumps using Hitachi VFDs to replace existing fan dampers and constant speed pump systems. Normally the requirements for these applications are less than the designed full volume capacity of the system. On mechanical systems, the inlet vanes or outlet dampers only restrict air flow; they do not actually reduce fan speed. With the Hitachi L300P drive, the actual fan speed is reduced, resulting in energy savings for your system.

Additional savings may be attained by use of the L300P's Automatic Energy Savings Feature. This function insures that the motor operates at the minimum current required to maintain load torque. Figure 3 shows an example of the "real time" energy savings available by use of this feature.

Most power companies now offer incentives to the user to install VFDs to lower energy consumption. Also the EPA is recommending VFDs as a key element for improving energy efficiency. Depending on usage, the payback period for a VFD should range from 1-2 years. For an illustration, please refer to the example of payback calculated in Figure 4.

Typical applications for HiPASS systems include:

- Supply and Return Fans
- Cooling Towers
- Compressors
- Centrifugal Pumps
- Rooftop Air Handlers

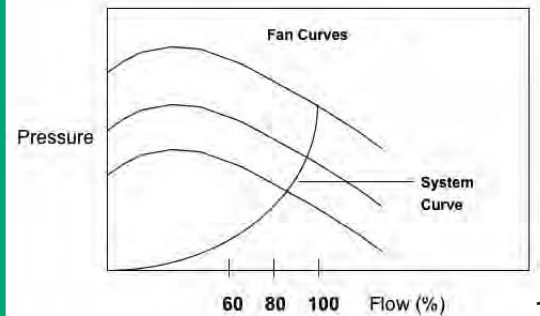
The HiPASS system has been designed with application specific features suited to fan and pump applications. The standard PID loop control permits the user to maintain a constant air flow. The HiPASS is supplied with embedded Building Automation System (BAS) and industrial protocols to connect seamlessly to your system. Additional hardware based protocols are available as options.

The LCD keypad can be preprogrammed for three (3) selectable parameters including kW. Also displayed are drive status, set and actual frequency and HAND/AUTO operation including Network Control. The LCD keypad can be used to perform READ/COPY functions to the drive.

The HiPASS system addresses those applications where minimizing downtime is critical. Additional features like power conditioning, motor overload protection and system status indication are designed into the package.

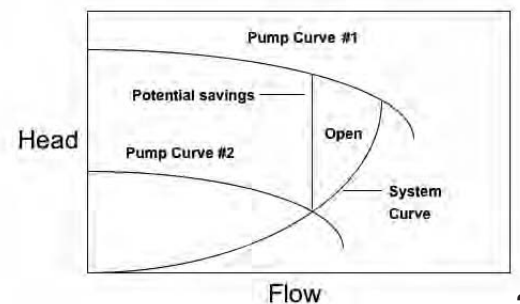
The Hitachi HiPASS system was designed for easy installation, setup and commissioning. However, this is done without sacrificing the features that your applications require. Easy access to control terminals, safety connections, analog inputs and BAS/serial interfaces reduces customer wiring time.

Fan Energy Savings with VFD



1

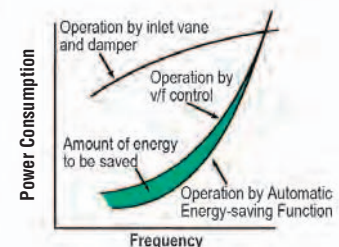
Pump Energy Savings with VFD



2

Automatic Energy Savings

Example of Energy Savings (Fan)



3

VFD Economics

Fan Example: 10HP \$.06kW-hr 8000 hrs/yr

% Speed	HP Req'd VFD	HP Req'd Damper	Duty Cycle (% of time)	HP Req'd VFD (Weighted)	HP Req'd Damper (Weighted)
100	10	10	20	2.00	2.00
80	5.1	9.6	30	1.53	2.88
60	2.2	8.8	30	0.66	2.58
40	.64	7.7	20	0.13	1.54
				4.32	9.00

Operating cost/yr (VFD): (WtHP) x (.746kW/HP) x (Hrs/yr) x (\$/kW-hr)
 Operating cost/yr (VFD): (4.32) x (.746) x (8000) x (.06) = **\$1547/yr**
 Operating cost (damper): (Mtr HP) x (.746kW/HP) x (Hrs/yr) x (\$/kW-hr)
 Operating cost (damper): (9) x (.746) x (8000) x (.06) = **\$3223/yr**

Annual Savings: \$ 3223 - 1547 = \$1676

4

HiPASS BYPASS PANEL

The HiPASS Bypass panel is designed to provide energy savings, reduced harmonic distortion, minimized down time, and easy interface with Building Automation Systems. The HiPASS panel will allow the user to operate their system from the L300P drive or directly across the AC input power line.

Compact Yet Accessible

The HiPASS Bypass system is produced in a side-by-side NEMA 1 compact design to use a minimum of wall space. Although compact and space saving, all HiPASS system internal components are easily accessible due to thoughtful design. This allows virtually any type of maintenance to be performed easily.

Set Up Preprogrammed

Because drive/bypass setup and commissioning is sometimes viewed as a “black art”, the HiPASS system is designed to eliminate these concerns. The system’s set up parameters have been preprogrammed at the factory to allow the service technician to run the system easily out of the box.

Test Runs Easily Accomplished

Keypad operation for both the speed reference and run/stop are standard set up parameters. Factory installed jumpers override the safety and run enable circuits at the customer terminal strip. This allows system test runs prior to the installation of these controls. If you are using a remote automatic signal, the system has been preprogrammed for a 4-20mA signal. The HAND/AUTO button also allows for switching between the local keypad and the automatic operation. If you are using a 0-10VDC automation signal, one of the Quick Menu selections will activate the O-L terminals (0-10VDC) on the customer terminal strip. Remote run terminals are provided to permit system operation from the BAS or industrial serial network.

Keypad for Adapting to Protocols

The HiPASS panel has been factory pre-configured to communicate with a 4-wire RS485 Modbus RTU protocol. Selection of other protocols including BAS systems is performed by use of the SC-OPE 3H keypad. Terminating resistors for connecting to RS485 protocols have been installed at the factory. This eliminates another step in system commissioning to BAS systems. The user friendly customer terminal strip provides for either 2 or 4 wire connections as well as ground and power terminals.

HiPASS Bypass Panel standard features:

- NEMA 1 Design (Side by Side)
- UL Listed 100kA Short Circuit Rating
- Quick Menu Selection
- 5% AC Line Reactor
- Quick Start Up Capability by Keypad
- Easy Access Customer Terminal Strip
- Drive Service Switch
- SC-OPE 3H Keypad (4 line, 20-character LCD display)
- Motor Overload Contactor
- HAND/AUTO Selection
- VFD/OFF/BYPASS switch
- 115VAC Transformer
- Fused Disconnect (through door)
- Write/Copy Capability (SC-OPE 3H)
- RS485 System Resistor Termination
- Terminals for Freeze-stat, Fire-Stat Safety Interlocks
- Purge Speed Selection
- System Power On Light
- Bypass On Light
- 2 Contactor Design – Power/Bypass
- Easy Connection and Selection of BAS Systems
- Safety/Run Enable Override Jumpers Installed



L300P SERIES DRIVE

Since the HiPASS system features the Hitachi L300P drive, which has been specifically designed to meet the many demands of variable torque applications, it has a long list of standard features, including the following:

Automatic Energy-Saving Function

With this feature, the L300P delivers “real-time” energy savings operation for your fan and pump application. Using this feature your AC Induction motor will operate at the minimum current necessary for load requirements.

“Quick Menu” Selectable Control Functions

Users can store their most frequently entered commands for easy operation.

PID Control

L300P series has PID control as a standard feature. When combined with the Multiple Speed feature, it can offer up to 16 set-point operations.

Intelligent Input/Output Relay Terminals

The L300P drive features an intelligent control terminal system, which allows programming of input, relay and analog I/O functions. It provides a PWM (FM monitor) output as well as (0-10VDC) and (4-20mA) analog output signals.

FieldBus Communications

The L300P AC drive has the capability of accepting up to 2 option PCB cards. Among these option cards are FieldBus protocols such as DeviceNet, ProfiBus, LonWorks and Ethernet.

Other Standard L300P Features:

- UL Listed 100kA Short Circuit Rating
- Anti-Windmilling
- Selectable Loss of Reference Operation
- Internal Regenerative Braking Circuit [up to 15kW (20hp)]
- Cooling fan On/Off Selection
- Cumulative Run/Power On Time Selection
- Removable Control Terminals
- 3 or 2 Wire Control
- Remote Control Speed Up/Down Feature
- Run Enable for Remote Start/Stop
- Auto Restart Selection Mode
- Dedicated Thermistor Protection Terminal
- Free Setting V/F Pattern for Custom Applications
- Easily Removable Cooling Fan and DC Bus Capacitors
- Dedicated DC Link Choke Terminals to Add External Optional DC Choke

Optional Features

DC Choke	3% Equivalent circuit for THD and power factor improvement
LC Filters	To eliminate damage to the motor insulation due to long cable length between the drive and motor
Drive Software	PC based drive software for easy setup and system data storage
FieldBus Option PCBs	LonWorks, Ethernet, Profi-Bus, and DeviceNet

SC-OPE 3H Enhanced Keypad:

The SC-OPE 3H keypad is designed for ease of programming, operation and maintenance. The keypad is removable and can be remote mounted using the accessory bezel kit, sold separately.

SC-OPE 3H Features:

- Backlit, 4-line, 20 character LCD display
- Functions grouped for easy access to view and edit parameters
- Compatible with major BAS (Building Automation System) systems
- HAND/AUTO selection and monitoring including network control
- Selectable "Quick Menu" up to 32 parameters
- Three (3) selectable parameters in monitor mode
- Drive status in monitor mode
- READ/WRITE function for download to other L300P VFD's
- Run and Set Frequency selection and monitoring
- Help information button
- Panel Remote mounting using optional bezel kit
- DIN rail remote mounting using optional bezel kit
- RS232C Connection for optional configuration software
- RS422 Connection to L300P
- RS485 Connection for BAS and industrial protocols such as Modbus RTU/ASCII, Siemens P1, AB DF1, Johnson N2, BACNET, and DirectNet.

Parameter Selection:

The SC-OPE 3H keypad allows the user to monitor three selectable system parameters which include current, % current, input kW and output voltage. Also displayed are set frequency, actual frequency, drive status and control parameters. HAND/AUTO, READ/WRITE capabilities are performed by use of a keypad button selection.

A quick menu selection of up to 32 parameters is available. The HiPASS system has been factory programmed with some of the most commonly used parameters; however, parameters can be added by use of the configuration software.



HIPASS BYPASS SYSTEM PANEL DIMENSIONS

208 volts, 3 phase

Model Number	Rated HP	Rated Amps	Dimensions in Inches (1)			Shipping Weight in Lbs. (2)
			Height	Width	Depth	
L300P-015LFU2PSK	2	7.5	26.350	24.060	9.987	66
L300P-022LFU2PSK	3	10.5	26.350	24.060	9.897	73
L300P-037LFU2PSK	5	16.5	26.350	24.060	9.987	80
L300P-055LFU2PSK	7.5	24	32.350	26.600	11.900	147
L300P-075LFU2PSK	10	32	32.350	26.600	11.900	162
L300P-110LFU2PSK	15	44	32.350	26.600	11.900	179
L300P-150LFU2PSK	20	58	34.350	30.060	11.900	193
L300P-185LFU2PSK	25	73	34.350	30.060	11.900	238
L300P-220LFU2PSK	30	85	44.290	42.100	12.560	243
L300P-300LFU2PSK	40	113	44.290	42.100	12.560	254
L300P-370LFU2PSK	50	140	44.290	42.100	12.560	269
L300P-450LFU2PSK	60	169	55.290	45.600	14.900	393
L300P-550LFU2PSK	75	210	55.290	45.600	14.900	437



230 volts, 3 phase

L300P-015LFU2PS	2	7.5	26.350	24.060	9.987	66
L300P-022LFU2PS	3	10.5	26.350	24.060	9.897	73
L300P-037LFU2PS	5	16.5	26.350	24.060	9.987	80
L300P-055LFU2PS	7.5	24	32.350	26.600	11.900	147
L300P-075LFU2PS	10	32	32.350	26.600	11.900	157
L300P-110LFU2PS	15	44	32.350	26.600	11.900	179
L300P-150LFU2PS	20	58	34.350	30.060	11.900	188
L300P-185LFU2PS	25	73	34.350	30.060	11.900	238
L300P-220LFU2PS	30	85	44.290	42.100	12.560	243
L300P-300LFU2PS	40	113	44.290	42.100	12.560	248
L300P-370LFU2PS	50	140	44.290	42.100	12.560	276
L300P-450LFU2PS	60	169	55.290	45.600	14.900	366
L300P-550LFU2PS	75	210	55.290	45.600	14.900	398

380 - 480 volts, 3 phase

L300P-015HFU2PS	2	3.8	26.350	24.060	9.987	62
L300P-022HFU2PS	3	5.3	26.350	24.060	9.897	62
L300P-040HFU2PS	5	8.6	26.350	24.060	9.987	79
L300P-055HFU2PS	7.5	12	26.350	24.060	9.897	96
L300P-075HFU2PS	10	16	26.350	24.060	9.897	108
L300P-110HFU2PS	15	22	26.350	24.060	9.897	114
L300P-150HFU2PS	20	29	32.350	26.600	12.897	171
L300P-185HFU2PS	25	37	32.350	26.600	12.897	192
L300P-220HFU2PS	30	43	32.350	26.600	12.897	206
L300P-300HFU2PS	40	57	34.350	30.060	11.900	228
L300P-370HFU2PS	50	70	34.350	30.060	11.900	264
L300P-450HFU2PS	60	85	44.290	42.100	12.560	291
L300P-550HFU2PS	75	105	44.290	42.100	12.560	310
L300P-750HFU2PS	100	135	44.290	42.100	12.560	305

Notes:

- (1) All NEMA 1 Enclosures
- (2) Shipping weight is Maximum Weight including options

NOTES

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