

Speed controllers and switches

Introduction to Speed Control

The use of different types of speed controllers allows overall fan capacity, sound level and absorbed power to be managed according to demand requirements. In many instances, the peak capacity of installed fans may only be required for limited duration or to meet specific demand situations. Running fans at full capacity when demand requires less than 100% duty has been identified as a significant source of energy waste in ventilation systems.

By incorporating fan speed control, particularly when directed by feedback from electronic management systems, the energy efficiency of installed ventilation plant can be greatly increased.

The types of speed control most often applied to fans are:

Triac	Used to control single phase external rotor motors.
Star/Delta Switch	Simple two speed switching of three phase motors.
Transformer	Ideal for three phase external rotor motors.
VSD	Highest performance for single or three phase motors

Selecting The Right Speed Control Option

To simplify the task of selecting the most appropriate method of speed control, all products manufactured by Pacific HVAC Engineering are cross referenced to the various controllers available. When selecting fans using our electronic selection software, **FansSelect**, the relevant speed control option (or options) by model are listed under the ancillaries tab. **FansSelect** is available for download at www.pacificHVAC.com.

For project wide support regarding speed control methods and costs, contact your local Pacific HVAC Engineering sales office.

The following tables provide a general guide to selecting speed controls taking into account performance, cost and complexity. The following pages provide more detailed information.



Single Phase-Electronic Speed Controllers		
For	Against	Comments
Low Cost	Should not control fans below 60% of full speed. Energy inefficient. Can create motor 'hum' at low speeds	Generally good for use with small fans below 0.5kW. Not suitable for foot or flange mount motors.

Single Phase-Transformer Speed Controllers		
For	Against	Comments
Very quiet fan operation, more efficient than electronic controllers.	Cost	The best speed control to use with single phase fans. Can be used with external rotor motors up to 2kW.

Three Phase-Transformer Speed Controllers (for external rotor motors)		
For	Against	Comments
Very quiet fan operation.	Cost and size	Easy, five step speed control for external rotor motors

Three and Single Phase-Variable Speed Drive		
For	Against	Comments
Very quiet fan operation, wide speed range, control inputs and signals.	Cost and Complexity	The best way to control three phase fans.

Note: It is not recommended to speed control conventional single-phase motors with triac type controllers due to heat build up and noise.

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DRV Series Variable Speed Drives

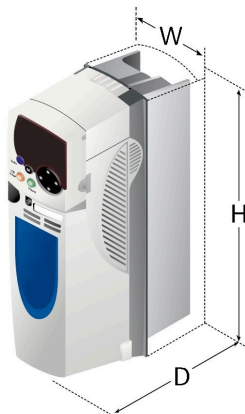
The DRV Series is a range of high performance speed controllers that change motor speeds by modifying the frequency of the electrical supply. Current generation drives offer exceptional efficiency of up to 98% and can be supplied for use as components in building management systems or for application to individual or groups of fans.

DRV Drives are BACnet compatible as standard for integration with BMS networks although Modbus RTU and Metasys N2 versions are available.

When selected in combination with higher efficiency motors, intelligent speed control offers the highest energy savings currently available in HVAC applications.

Features

- Integrated network connectivity with multiple standards.
- Sleep / Wake mode for demand management.
- Low load detection to sense system mechanical problems.
- Smartcard data storage.
- High switching frequency of up to 16 kHz for quiet motor operation.
- Available with either IP20 or IP54 enclosures.
- On board temperature control ensures uninterrupted drive performance.
- Flexibility to work with BMS Systems or stand alone applications.
- Simple and intuitive keypad / LCD interface.
- Compact size.
- Ethernet communications option available.



Selecting The Right VSD Option

To simplify the task of selecting the most appropriate VSD, all products manufactured by Pacific HVAC Engineering are cross referenced to the various drives available. When selecting fans using our electronic selection software, **FansSelect**, the relevant VSD option (or options) by model are listed under the ancillaries tab. **FansSelect** is available for download at www.pacificHVAC.com.

Installation and commissioning

Correct installation, wiring and setup of VSD's is essential to avoid damage to the drives and to ensure Electro-Magnetic Compliance (EMC) regulations are adhered to. For project specific support regarding selection and installation of VSD's contact your local Pacific HVAC Engineering sales office.

Part IP20	Part IP54	Motor Output kW	Max Cont. Current	Frame Size	W DRV20	W DRV54	H DRV20	H DRV54	D DRV20	D DRV54	kg DRV20	kg DRV54
DRV20-01100-3	DRV54-01100-3	1.1	2.8	1	100	184	386	560	219	264	5	9
DRV20-01500-3	DRV54-01500-3	1.5	3.8									
DRV20-02200-3	DRV54-02200-3	2.2	5									
DRV20-03000-3	DRV54-03000-3	3	6.9									
DRV20-04000-3	DRV54-04000-3	4	8.8									
DRV20-05500-3	DRV54-05500-3	5.5	11									
DRV20-07500-3	DRV54-07500-3	7.5	15.3	2	155	236	552	262	7	12		
DRV20-11000-3	DRV54-11000-3	11	21									
DRV20-15000-3	DRV54-15000-3	15	29									
DRV20-18500-3	DRV54-18500-3	18.5	35									
DRV20-22000-3	DRV54-22000-3	22	43	3	250	331	544	260	302	15	25	
DRV20-30000-3	DRV54-30000-3	30	56									
DRV20-37000-3	DRV54-37000-3	37	68	4	310	386	547	703	298	346	30	40
DRV20-45000-3	DRV54-45000-3	45	83									
DRV20-55000-3	DRV54-55000-3	55	104									
DRV20-75000-3	DRV54-75000-3	75	138									

Notes: For sizes 1-4 (DRV20) and 1-3 (DRV54) drives, the continuous ratings given are for maximum 40°C [50°C with derating], 1,000m altitude and 3.0kHz switching. For size 4 DRV54 drive, the continuous rating given is for maximum 35°C [40°C with derating], 1,000m altitude and 3.0kHz switching. Select drives on actual motor full load current. All drives include keypad and internal EMC filters.

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VA Series Speed Controller

The VA series of speed controllers offers a comparatively low cost option for varying the flow, power consumption and sound levels of single phase fans with a current rating of up to 10 amps. Speed control ranges from 100% down to approximately 30%.

Notes

VA speed controllers are recommended for external rotor motor fans to ensure adequate cooling under speed control conditions. They should not be used to speed control fans with conventional foot or flange mount single phase motors other than models designated as being speed controllable. Refer to the wiring diagram packaged with the controller for specific instructions relating to installation. PSC (Permanent Split Capacitor) motors can be installed with three wire configuration to help minimise motor hum.

When more than one fan is to be controlled, the fans should be of the same type and capacity with the combined full load current not exceeding 85% of the controller FLC rating.

Part	Notes	Max. Amps	Mounting
VA500B	On/Off Switch, Triac Control	2.0	Wall Plate
VA500-GAW*	On/Off Switch, Triac Control, FWD/REV Switch	2.0	Wall Plate
VA7 00B-NEON	On/Off Switch, Triac Control, Neon Indicator	2.9	Wall Plate
VA7 00B-FITTED	Equipment or enclosure mount, no switch	2.9	Bracket
VA1200B	On/Off Switch, Triac Control	5.0	Wall Plate
VA2400	On/Off Switch, Triac Control	10.0	Wall Plate

* For use with GAW230 and GAW300 wall and window fans only.



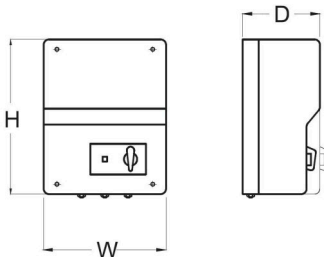
RE and RD Series Speed Controller

The RE (single phase) and RD (three phase) series of speed controllers offers 5 step speed adjustment using transformer type voltage control. Speed control ranges from 100% down to approximately 30%.

Notes

RE and RD speed controllers are recommended for external rotor motor fans to ensure adequate cooling under speed control conditions. They should not be used to speed control fans with conventional foot or flange mount motors other than models designated as being speed controllable by voltage adjustment. Refer to the wiring diagram packaged with the controller for specific instructions relating to installation.

When more than one fan is to be controlled, the fans should be of the same type and capacity with the combined full load current not exceeding 85% of the controller FLC rating.



Part	V/Phase	Max. Amps	Protection	D	H	W	kg
RE1.5G	240 Single	1.5	IP54	80	180	105	2
RE2G	240 Single	2.0	IP54	114.5	230	166	2.2
RE3.5G	240 Single	3.5	IP54	114.5	230	166	3.5
RE6 G	240 Single	6.0	IP54	114.5	230	166	5
RE7 .5G	240 Single	7.5	IP54	115	284	240	6
RE9G	240 Single	9.0	IP54	115	284	240	10.5
RE12	240 Single	12.0	IP21	148	323	270	10.5
RE14G	240 Single	14.0	IP54	148	323	270	12.5
RD1G	415 Three	1.0	IP54	115	284	240	4.5
RD2G	415 Three	2.0	IP54	115	284	240	7.2
RD3G	415 Three	3.0	IP54	146	323	270	10.8
RD4	415 Three	4.0	IP21	146	323	270	11
RD5.2G	415 Three	5.2	IP54	146	323	270	15.6
RD7	415 Three	7.0	IP21	146	323	270	15.6

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Star / Delta Switch Speed Controller

Star/Delta switches allow speed control of three phase motors. They provide on/off and high/low speed by changing between the star or delta wiring configuration of the motor. Suitable for all three phase external rotor motors and most three phase motors fitted to axial flow fans.

Notes

Two versions are available for either recessed panel mount or surface mount. The switches do not provide motor protection.

Part	Max. Amps	Mounting	Protection	Dimensions
SD SWITCH	20	Panel (recessed)	IP6 5 (from front)	H110 x D50 x W50
SD	20	Surface	IP6 5	H140 x D120 x W80



ROTV Run On Timer

Run on timers are wired with a permanent active feed allowing the fan plugged into the unit to continue running for a pre-determined time period after the wall switch has been turned off. Ideal for use in toilets and bathrooms where continued extract ventilation after leaving the room is a practical solution.

Notes

ROTV's are available in pre-wired configuration with four pin plugs or as a bare unit for wiring in on site. Run on time can be set from 2 to 20 minutes by simple screw driver adjustment.

Part	Max. Amps	Mounting	Dimensions
ROTV (4 Pin Plug In Lead)	5	Surface	H115 x D52 x W115



ROT-D Run On Timer

Seven minute delay timer for single phase exhaust fans with maximum current draw of 2 amps (500W). The small size of the unit allows installation in the wall cavity behind the switch or within the fan housing.

Part	Max. Amps	Mounting	Dimensions*
ROT-D	2	Internal	H12 x D40 x W50