



Himel Variable Speed Drives

SMART Pump





About Himel

Himel is a multinational manufacturer and provider of electrical products successfully combining global expertise with local knowledge.

Founded by a Spanish entrepreneur in 1958, the company pioneered in exporting quality electrical enclosures, establishing Himel brand globally. Today, our global footprint and technology enable us to provide the best combination of affordable and reliable offers for Low Voltage Power distribution, Industry Automation and Home Electric to our long-term customers and partners in over 50 countries where we are present.

Himel. Reliable made affordable



SMART Pump (SP)

SMART Pump (SP) drives are full-featured dedicated drives for parabolic load applications like pumps, fans, and chillers. SP drives have a wide range of integrated features like multi-pump control, dry run protection, sensor-less flow and energy calculation, pump cleaning, fire override mode, frost, condensation and hammer effect protections to meet the needs of pump, fans and chillers for modern buildings.

| Motor Capacity (kW) | | | | | | | | | | | | | | | | | |
|---------------------|---|---|-----|-----|----|----|----|----|----|----|----|----|----|----|-----|-----|-----|
| 2.2 | 3 | 4 | 5.5 | 7.5 | 11 | 15 | 19 | 22 | 30 | 37 | 45 | 55 | 75 | 90 | 110 | 132 | 160 |
| HAV-SP-4T* | | | | | | | | | | | | | | | | | |
| HAV-SP-2T** | | | | | | | | | | | | | | | | | |

*4T: 380V 3 phase

**2T: 220V 3 phase

Improved Energy Savings

With many integrated control modes like ECO-mode, V^2/f , and PID with sleep mode.

High Robustness

- Stable operation in difficult environments
- Built-in category C3 EMC filter ($\geq 11kW$)

Special program functions



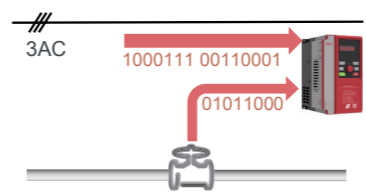

- Multi-pump control
- Energy meter
- Flow calculation
- Pump cleaning
- Fire Override mode
- Dual Ramp

Pump-specific protections

- Dry run detection
- Frost and condensation protection
- Hammer effect protection
- Undervoltage, overvoltage, overcurrent, overload protection
- Phase-loss protection
- Short-circuit protection



Reliable made affordable

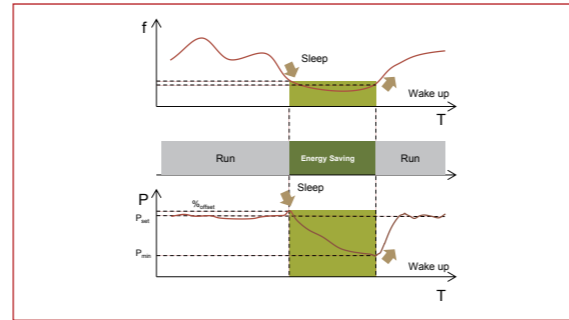
| Features | Your benefits |
|---|--|
| Improved energy savings | |
|  <ul style="list-style-type: none"> ◆ Integrated Eco-mode for V/f and V^2/f automatically adapts the motor magnetic flux to save energy ◆ Improved special PID control with sleep mode helps to save more energy for pump application | <ul style="list-style-type: none"> ◆ Energy savings during low dynamic load cycles such as pump and Fan ◆ Increase the potential savings by up to 70% ◆ Greatly reduces the return time of investment |
| High Robustness | |
|  <ul style="list-style-type: none"> ◆ Stable operation under main input voltage fluctuations. Reliable operation with net tensions between 380V and 480V (-15%/+10 %) ◆ Equipped with built-in category C3 standard EMC filter ($\geq 11kW$) | <ul style="list-style-type: none"> ◆ Wider voltage range, increases robustness of the drive in difficult environment ◆ Automatic adaptation in case of unstable power supply ◆ Better electromagnetic immunity against signal noises. ◆ Supports longer connection cables. |
| Special pump functions | |
|  <ul style="list-style-type: none"> ◆ Multi-pump control ◆ Built-in energy and flow meter ◆ Pump cleaning ◆ Fire Override mode ◆ Dual Ramp | <ul style="list-style-type: none"> ◆ Control 4 pumps (with external I/O card) ◆ Measure energy and flow without an external sensor ◆ Clears the blockage in the pump ◆ Reduces the maintenance requirements ◆ Keeps the critical fans and pumps running in case of fire in a building ◆ Separate initial and final ramp ratio optimizes the motor start and stop |
| Pump-specific protections | |
|  <ul style="list-style-type: none"> ◆ Dry run detection ◆ Frost and condensation protection ◆ Hammer effect protection. ◆ Overvoltage, overcurrent, overload protection ◆ Phase-loss protection ◆ Short-circuit protection | <ul style="list-style-type: none"> ◆ Protects the impeller and rear housing against dry run. ◆ Protects the pump against moisture and water freezing inside pump. ◆ Controls the water flow when pipe is empty hence eliminating the hammer effect at the starting phase. ◆ Long lifecycle running in high humidity and high dust occasions ◆ Easy to maintain |



SPECIAL FEATURES AND BENEFITS

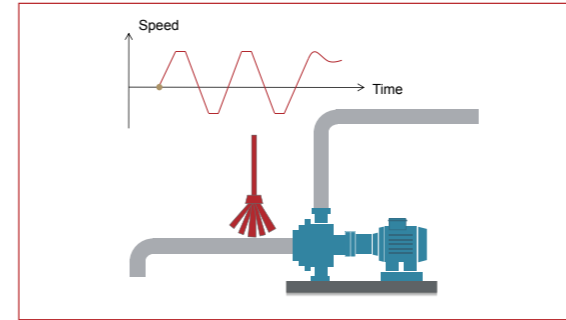


PID with Sleep mode



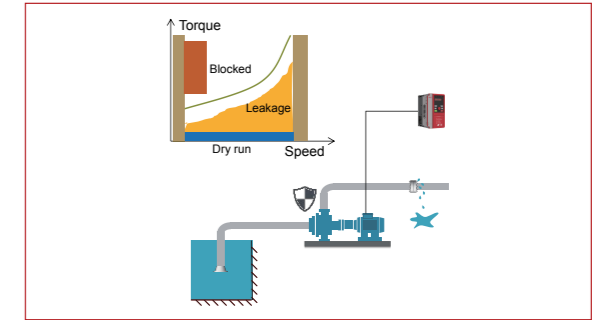
- ◆ Frequent start/stop of the pump wastes energy and causes wear and tear in the pump.
- ◆ PID with sleep mode switches the pump to sleep mode if the pressure increases by a fixed value above the set point.
- ◆ It will wake up the pump if the pressure inside the pipe falls below the lowest required pressure set by the user.
- ◆ PID with sleep mode helps save more energy and enhances pump life

Pump-cleaning function



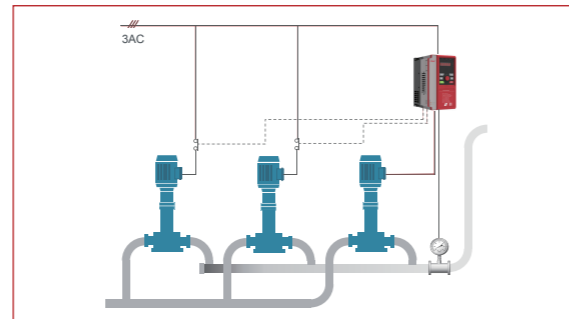
- ◆ In the sewage water processing, the blockage in the pump will reduce the efficiency of the system and make the starting phase very difficult.
- ◆ With pump-cleaning function, the blockage can be swept automatically before the normal operation.
- ◆ It reduces the maintenance requirements

Special Pump Protections



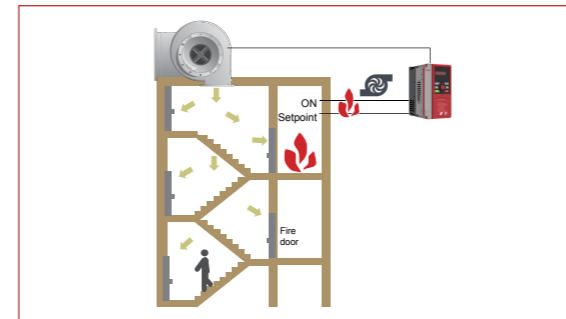
- ◆ The drive can track the load and protect against
 - Dry pump run.
 - Leakage or pipe breakage
 - Blockage in the pipe.
- ◆ Protect the pump against abnormal loads.
- ◆ Protect impeller and rear housing against dry run.
- ◆ Extends pumps life.

Multi-pump Control (Fixed)



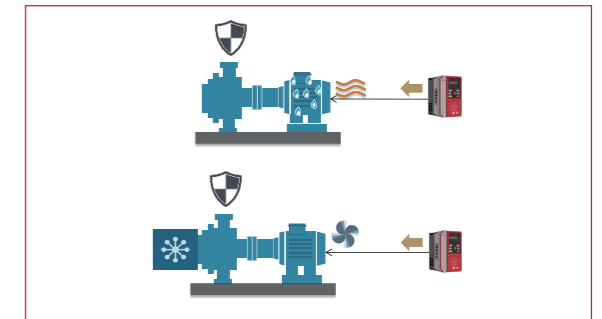
- ◆ Control up to 3 pumps (4 pumps with I/O card) for start, stop and switchover by integrated PID controller.
- ◆ Fixed Type: Motor connected to the drive's output is fixed. VSD increases/decreases the number of motors run by the power grid depending on PID feedback.
- ◆ Floating Type: Motor connected to the drive is not fixed. Drive switches to the next motor and hands over the previous pump to the power grid.
- ◆ Smooth start and stop of each pump to ensure best performance
- ◆ Reduces the total cost of ownership

Fire Override mode



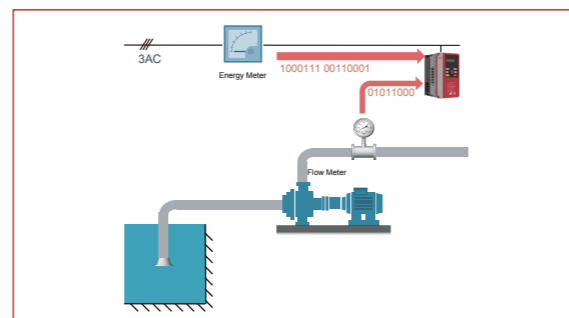
- ◆ The control system or wiring may be damaged in the fire disaster situation, which may disconnect the setpoint or run command of the critical fans in the stair well, tunnel, subway such important space.
- ◆ Fire override mode will keep the fans working without controller in critical situations and help maintain the air-supply and keep fireproof door closed.
- ◆ It keeps fans working to give the pressure in the stair well to force the fireproof door close to reduce the spread of fire and smoke

Frost and Condensation Protection



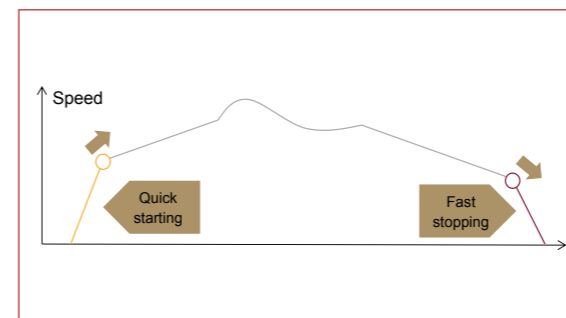
- ◆ Water frozen inside pump damages the pump. Frost protection keeps the motor slowly moving to avoid water freezing inside pump.
- ◆ In humid and cold environments, condensation can cause motor failure. Condensation protection keeps motor warm to get rid of moisture.

Energy and flow calculator



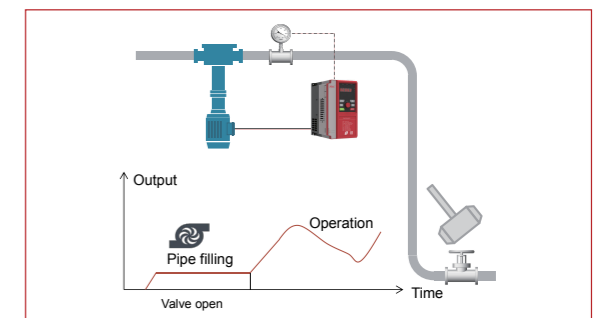
- ◆ Data will be more and more important for the energy audit to continuously improve the system performance.
- ◆ The water volume or flow data will indicate the real-time status. With the Energy and Flow meter, SMART Pump will estimate the energy consumption to explain the status of running pump or fan system to optimize the system

Dual Ramp



- ◆ Separate initial and final ramp ratio optimizes the motor start and stop. During start phase, pumps (esp. submersible pumps) are more prone to wear and tear if the ramp up is slow. A quick ramp up at start phase protects the pump from wear and tear.
- ◆ Slow ramp up after the initial phase improves the control accuracy.

Hammer Effect protection



- ◆ In pumping applications, during start phase high speed inrush water can hit the pump very hard which is know as "hammer effect"
- ◆ Smart Pump drive can fill the pipe smoothly at the start phase to avoid pump damage.

Target Applications



■ Irrigation



■ Sewage



■ Fountain



■ Sand pump



■ Circulating pump



■ Rod pump



■ Drying



■ Ventilation



■ Dust removal



■ Hot surface treatment



■ Air supply fan for boiler



■ Industrial fan



■ Centrifugal chillers




■ Reciprocating chillers



■ Scroll chillers



Specifications

| Range Name | | SMART Pump |
|-------------------------------------|---------------------------|--|
| Design | |  |
| Capacity range | Three phase 200V Class | AC: 200V(-15%)-240V(+10%) 2.2~45kW |
| | Three phase 400V Class | AC:380V(-15%)~440V(+10%) 2.2~160kW |
| Frequency | Input frequency | 50/60Hz |
| | Output frequency | 0-599Hz |
| Overload capacity | | 120% for 1min |
| Control method | V/f | √ |
| | Sensorless vector control | √ |
| | Eco mode control | √ |
| Start torque | | 0.5Hz, 120% |
| Built-in PID | | √ |
| Keypad | | Pluggable |
| Display | | LED/LCD |
| Multispeed control | | 16 stages in one cycle |
| I/O | DI1-DI4 | NPN/PNP, Input: 9-30VDC |
| | DI5 | NPN/PNP, Input: 15-30VDC |
| | DO1 | Pulse input: max. 50kHz |
| | DO2 | 9-30VDC, max. 50mA |
| | | 9-30VDC, max.50mA |
| | | Pulse output max.50kHz |
| | | V: 0-10V |
| | | I:0-20mA |
| | Resolution:1/1000 | |
| | AO1 | V: 0-10V |
| | AO2 | I:0-20mA |
| | | Resolution:1/1000 |
| | RO(Ta, Tb, Tc) | NO: 24VDC 3A/ 250VAC 5A |
| | | NC: 24VDC 3A/ 250VAC 3A |
| Built-in communication (Max. speed) | | RS485, Modbus RTU (38.4kbps) |
| Options | Extension I/O | DI/DO/RO |
| | Extension Keypad | Support, cable length:2m, 5m |
| Functionality | | Multi-pump control Dry run protection Energy/ flow calculator Frost and condensation protection Pump cleaning Fire override mode Eco-mode/PID with sleep mode/Special pump protections |
| Installation Way | | Wall mounted, cabinet, flange installation |
| Dust Shields | | √ |
| EMC Filter | C2 | - |
| | C3 | Built-in EMC filter (>=11kW) |
| Braking unit | | Built-in (<=22kW) |
| Environment | Operation temperature | -10-40 C no capacity reduction, 40 C -50 C capacity reduction |
| | Humidity | ≤95%RH |
| | Altitude | ≤1000m, no capacity reduction |
| | IP level | IP20 |
| Global certificates | | CE |



Specifications

| Range Name | | SMART Pump |
|-------------|-----------------------------------|---|
| Design | |  |
| Features | Velocity ratio | 1:100 |
| | Frequency precision | Digital setting: Max frequency X ±0.01% |
| | | Analog setting: Max frequency X ±0.2% |
| | Frequency resolution | Digital setting: Max frequency X ±0.01% |
| | | Analog setting: Max frequency X ±0.1% |
| | Torque rise | Integrated auto-torque raising function; with manual- setting: 0.1%~30.0% |
| | V/F control curve definition | Linear, Square, V ^{1.7} /F, V ^{1.2} /F |
| | Acceleration/Deceleration Time | 4 types of ACC/DEC time selection; optional time unit selection(Min/s); setting range: 0~60hours; |
| | DC braking | Start frequency: 0.00~60.00Hz; braking time: 0.0~30.0S; |
| | | braking current: 0.0~100% |
| | Automatic voltage regulation(AVR) | √ |
| | Auto current limitation | √ |
| | Auto PMW adjustment | √ |
| Protections | Special pump protection | Voltage limit, dry run, pump load monitor, frost and condensation protections |
| | VSD protection function | Over-current, over-voltage, under-voltage, over-heat, over-load, short circuit. |
| | Cooling | Air-cooling |
| Warranty | | 24 months |

Reference Selection

| Range Name | Series Name | Input | Adaptation | Drive |
|---|-------------|---------------------------|--|----------------|
| HAV | SP | 4T | 0110 | P |
| HA: Himel Automation | S:SMART | 2: 220V 4: 380V – 440V | 0022: 2.2kW 0075: 7.5kW 0110: 11kW 0185: 18.5kW 1100: 110kW | P: Normal-duty |
| V: VSD M: Motion H: HMI P: PLC | P: Pump | T: Three-phase | | |

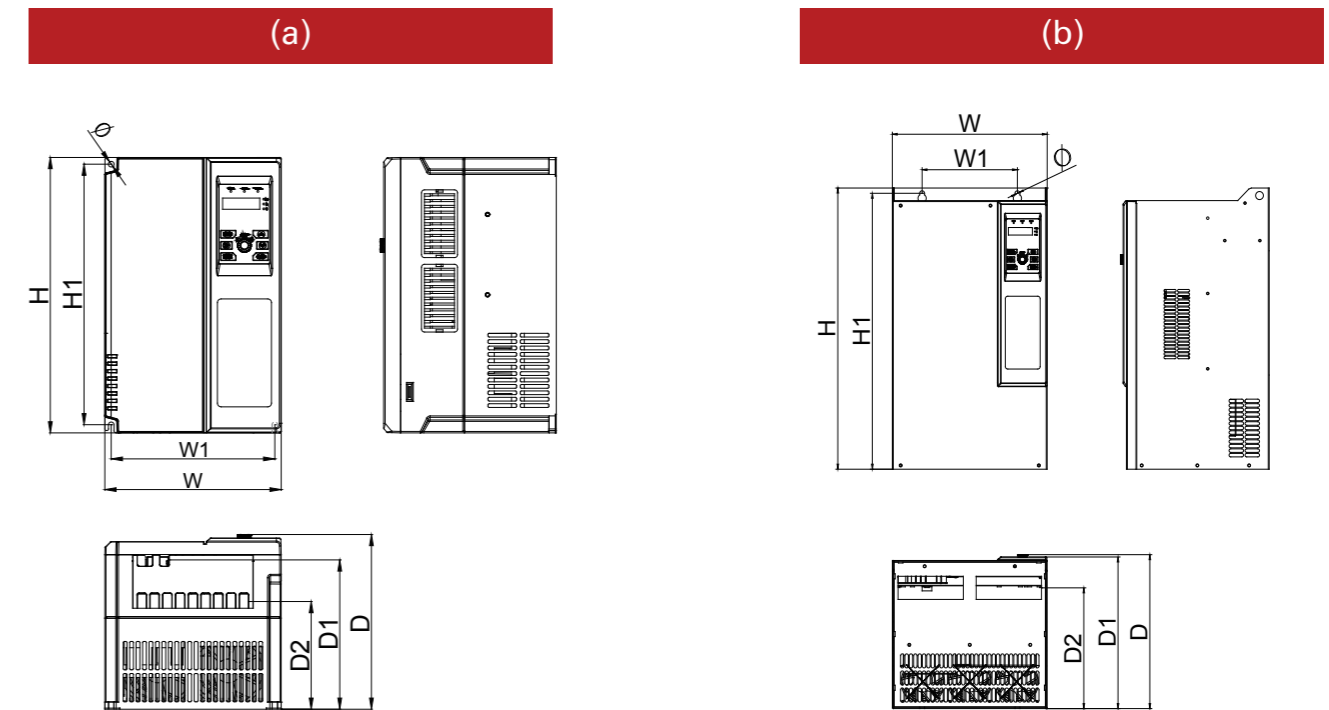
References

| Input Voltage | Commercial Reference | Selection | | | Overload Output Current | |
|-------------------------------|-------------------------------|------------------|------------------|-------------------------------|-------------------------|------|
| | | Motor Power (kW) | Motor Power (HP) | Continuous Output Current (A) | A | % |
| AC: 200 - 240V Three Phase | HAVSP2T0022P | 2.2 | 3 | 10.08 | 12.1 | 120% |
| | HAVSP2T0030P | 3 | 4 | 11.5 | 13.8 | 120% |
| | HAVSP2T0040P | 4 | 5 | 16.2 | 19.4 | 120% |
| | HAVSP2T0055P | 5.5 | 7.5 | 20.3 | 24.4 | 120% |
| | HAVSP2T0075P | 7.5 | 10 | 26.7 | 32 | 120% |
| | HAVSP2T0110P | 11 | 15 | 39 | 46.8 | 120% |
| | HAVSP2T0150P | 15 | 20 | 52.5 | 63 | 120% |
| | HAVSP2T0185P | 18.5 | 25 | 62.4 | 74.9 | 120% |
| | HAVSP2T0220P | 22 | 30 | 73.6 | 88.3 | 120% |
| | HAVSP2T0300P | 30 | 40 | 98.7 | 118.4 | 120% |
| | HAVSP2T0370P | 37 | 50 | 121 | 145.2 | 120% |
| | HAVSP2T0450P | 45 | 60 | 147 | 176.4 | 120% |
| | AC: 380 - 440V Three Phase | HAVSP4T0022P | 2.2 | 3 | 5 | 6 |
| HAVSP4T0030P | | 3 | 4 | 7.5 | 9 | 120% |
| HAVSP4T0040P | | 4 | 5 | 8.8 | 10.6 | 120% |
| HAVSP4T0055P | | 5.5 | 7.5 | 13 | 15.6 | 120% |
| HAVSP4T0075P | | 7.5 | 10 | 17 | 20.4 | 120% |
| HAVSP4T0110P | | 11 | 15 | 25 | 30 | 120% |
| HAVSP4T0150P | | 15 | 20 | 32 | 38.4 | 120% |
| HAVSP4T0185P | | 18.5 | 25 | 37 | 44.4 | 120% |
| HAVSP4T0220P | | 22 | 30 | 45 | 54 | 120% |
| HAVSP4T0300P | | 30 | 40 | 60 | 72 | 120% |
| HAVSP4T0370P | | 37 | 50 | 75 | 90 | 120% |
| HAVSP4T0450P | | 45 | 60 | 90 | 108 | 120% |
| HAVSP4T0550P | | 55 | 75 | 110 | 132 | 120% |
| HAVSP4T0750P | | 75 | 100 | 157 | 188.4 | 120% |
| HAVSP4T0900P | | 90 | 125 | 180 | 216 | 120% |
| HAVSP4T1100P | | 110 | 150 | 214 | 256.8 | 120% |
| HAVSP4T1320P | 132 | 175 | 256 | 307.2 | 120% | |
| HAVSP4T1600P | 160 | 200 | 307 | 368.4 | 120% | |

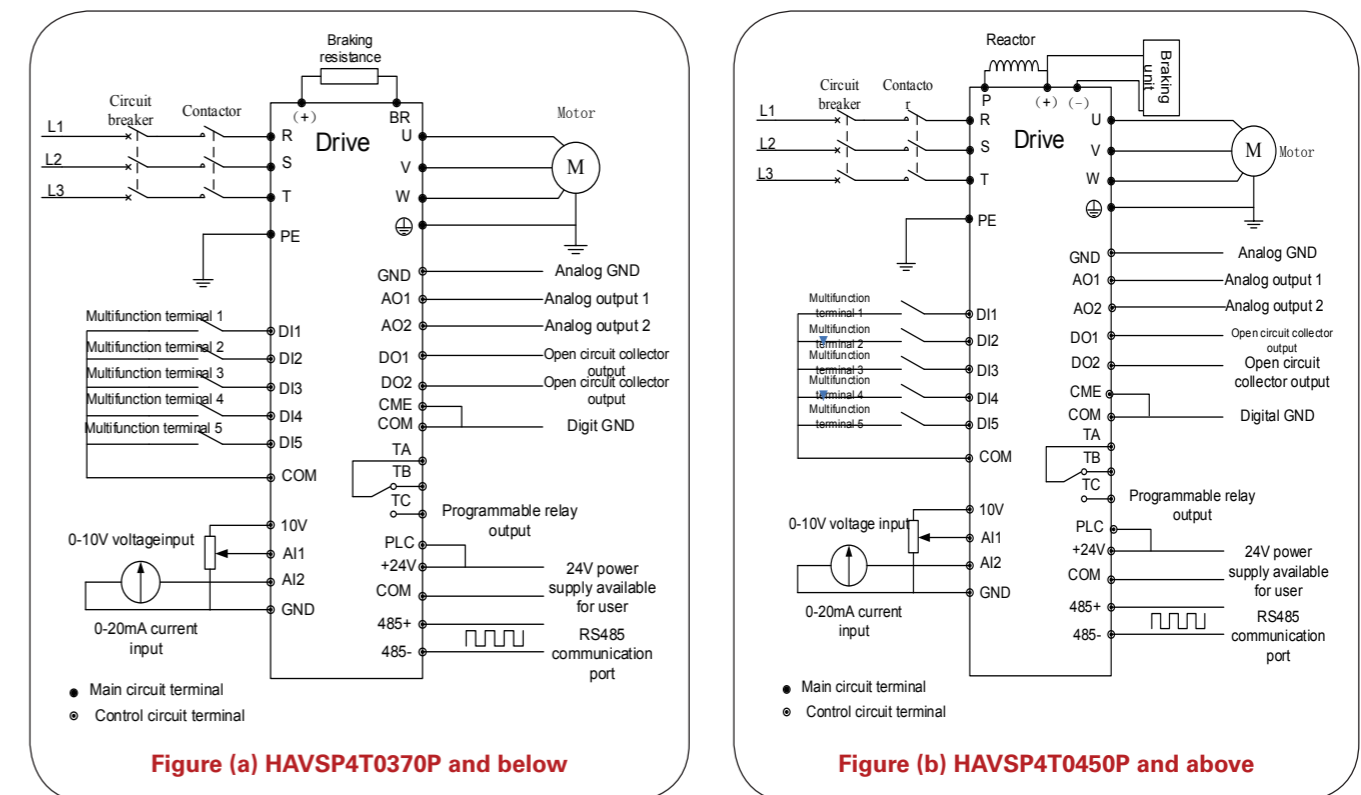
Dimensions

| Input Voltage | Commercial Reference | Dimensions(mm) | | | Mounting Dimensions (mm) | | | | Mounting Hole Diameter (mm) | CAD Diagram |
|-----------------------------|----------------------|----------------|-----|-----|--------------------------|-----|-----|-----|-----------------------------|-------------|
| | | W | H | D | W1 | H1 | D1 | D2 | | |
| AC: 200-240V Three Phase | HAVSP2T0022P | 120 | 215 | 163 | 109 | 204 | 133 | 85 | 5.5 | (a) |
| | HAVSP2T0030P | 120 | 215 | 163 | 109 | 204 | 133 | 85 | 5.5 | |
| | HAVSP2T0040P | 120 | 215 | 163 | 109 | 204 | 133 | 85 | 5.5 | |
| | HAVSP2T0055P | 150 | 259 | 181 | 138 | 248 | 150 | 104 | 5.5 | |
| | HAVSP2T0075P | 150 | 259 | 181 | 138 | 248 | 150 | 104 | 5.5 | |
| | HAVSP2T0110P | 205 | 322 | 215 | 188 | 305 | 176 | 130 | 6.5 | |
| | HAVSP2T0150P | 235 | 370 | 235 | 218 | 350 | 200 | 146 | 7 | |
| | HAVSP2T0185P | 235 | 370 | 235 | 218 | 350 | 200 | 146 | 7 | |
| | HAVSP2T0220P | 305 | 490 | 275 | 200 | 470 | 270 | 211 | 10 | |
| | HAVSP2T0300P | 305 | 490 | 275 | 200 | 470 | 270 | 211 | 10 | |
| | HAVSP2T0370P | 320 | 560 | 307 | 197 | 543 | 302 | 240 | 10 | (b) |
| | HAVSP2T0450P | 320 | 560 | 307 | 197 | 543 | 302 | 240 | 10 | |
| | HAVSP4T0022P | 120 | 215 | 163 | 109 | 204 | 133 | 85 | 5.5 | |
| | HAVSP4T0030P | 120 | 215 | 163 | 109 | 204 | 133 | 85 | 5.5 | |
| AC: 380-440V Three Phase | HAVSP4T0040P | 120 | 215 | 163 | 109 | 204 | 133 | 85 | 5.5 | (a) |
| | HAVSP4T0055P | 120 | 215 | 163 | 109 | 204 | 133 | 85 | 5.5 | |
| | HAVSP4T0075P | 120 | 215 | 163 | 109 | 204 | 133 | 85 | 5.5 | |
| | HAVSP4T0110P | 150 | 259 | 181 | 138 | 248 | 150 | 104 | 5.5 | |
| | HAVSP4T0150P | 150 | 259 | 181 | 138 | 248 | 150 | 104 | 5.5 | |
| | HAVSP4T0185P | 205 | 322 | 215 | 188 | 305 | 176 | 130 | 6.5 | |
| | HAVSP4T0220P | 205 | 322 | 215 | 188 | 305 | 176 | 130 | 6.5 | |
| | HAVSP4T0300P | 235 | 370 | 235 | 218 | 350 | 200 | 146 | 7 | |
| | HAVSP4T0370P | 235 | 370 | 235 | 218 | 350 | 200 | 146 | 7 | |
| | HAVSP4T0450P | 305 | 490 | 275 | 200 | 470 | 270 | 211 | 10 | |
| | HAVSP4T0550P | 305 | 490 | 275 | 200 | 470 | 270 | 211 | 10 | (b) |
| | HAVSP4T0750P | 320 | 560 | 307 | 197 | 543 | 302 | 240 | 10 | |
| | HAVSP4T0900P | 320 | 560 | 307 | 197 | 543 | 302 | 240 | 10 | |
| | HAVSP4T1100P | 320 | 560 | 307 | 197 | 543 | 302 | 240 | 10 | |
| | HAVSP4T1320P | 355 | 678 | 319 | 240 | 659 | 314 | 261 | 11 | |
| | HAVSP4T1600P | 355 | 678 | 319 | 240 | 659 | 314 | 261 | 11 | |

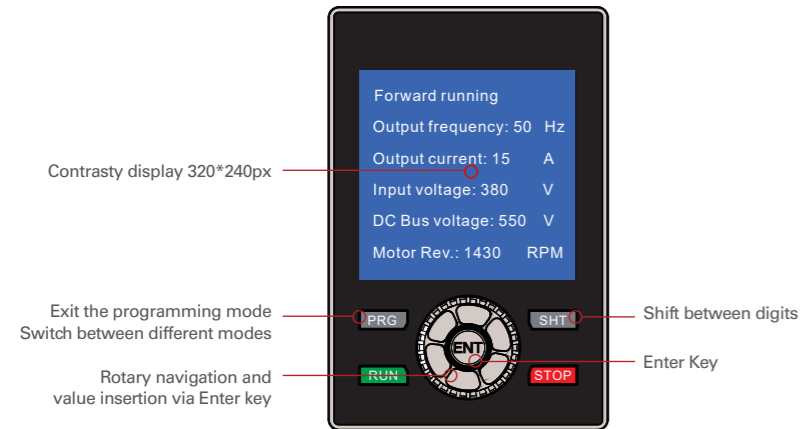
CAD Diagrams



Wiring Diagrams



LCD Keypad



| Features | Benefits |
|---------------------|---|
| Display | <ul style="list-style-type: none"> ◆ More visible status information ◆ Intuitive operation ◆ Short commissioning times ◆ User-friendly interface |
| Rotary navigation | <ul style="list-style-type: none"> ◆ Quick navigation and input of values |
| Quick commissioning | <ul style="list-style-type: none"> ◆ Visible parameter names ◆ Possible to commission without documentation ◆ Easily copy parameters between multiple drives |

VSD Accessories

| Type | Commercial Reference | Short Description | Applicable Product | | Pictures |
|-------------------|----------------------|---|---------------------------------|------------------|---|
| | | | Applicable Commercial Reference | Specifications | |
| IO extension card | HAVXSIO3DIR | IO extension card with 3 Di and 1 relay | HAVSP4T0022P ~ HAVSP4T1600P | 4T*: 2.2 - 160kW |  |
| Keypad bracket | HAVXSJPT | Keypad holder for external keypad | HAVSP4T0022P ~ HAVSP4T1600P | 4T*: 2.2 - 160kW |  |
| External Keypad | HAVSPLKD** | External keypad | HAVSP4T0022P ~ HAVSP4T1600P | 4T*: 2.2 - 160kW |  |
| | HAVSPLCD | LCD keypad | HAVSP4T0022P ~ HAVSP4T1600P | 4T*: 2.2 - 160kW |  |
| Keypad cable | HAVXSCAB2 | Length 2m | HAVSP4T0022P ~ HAVSP4T1600P | 4T*: 2.2 - 160kW |  |
| | HAVXSCAB5 | Length 5m | HAVSP4T0022P ~ HAVSP4T1600P | 4T*: 2.2 - 160kW | |

*4T: 380V 3 Phase
 ** All VSDs have built-in removable keypad. HAVSPLKD is sold as a spare part.

Global sales, global service



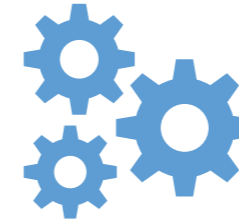
Support and Consulting Services



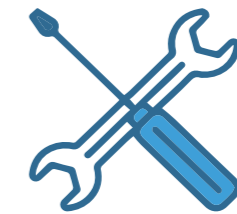
Training Services



Spare Parts Services



Repair Services



Contact Himel team

support@himel.com



Contact local distributor

Company name:

Contact:

Tel:

Email:

Address:

