Powtran technology
Professional manufacturer of frequency inverter based on the motor design and manufacture.

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Product Overview

PI500 series high-performance vector control inverter is based on the company’s many years of design, production, sales experience, suitable for all kinds of industrial machinery, fan & water pump drive control and heavy industry such as medium frequency grinding. Products in duct design, hardware configuration, software functions, installation design has greatly improved the customer ease of use and environmental adaptability, function optimization, application is more flexible, more stable performance, greatly improve the product reliability.
Company Introduction

Powtran Technology as a national high-tech enterprise, set up Wuxi, Guangzhou and more than 30 offices with the center of Shanghai and Dalian cities and established a worldwide network of R & D, production, logistics and service. Composing the advanced technology from Japan Toshiba and Taiwan brand, Powtran provides a series of energy saving and automatic & drive control products, such as frequency inverters (including special power supply), soft starters, AC servo drive system, energy saver, vehicle motor drive system, Powtran products are verified by international authoritative organizations and now export to more than 100 countries.

Company History

2016: Won the "2015 - 2016 annual inverter innovation award"; as the vice chairman of the China Electrical Equipment Industry Association - inverter branch for three consecutive years , and won the advanced member during 2012-2016.
2015: PI500 series of high-performance vector inverter was launched; won the award "the most influential brand in three decades".
2014: TUV factory-examining certification company. The standards that Powtran took part in drafting already implemented.
2013: PI9000 series new product has passed the EU CE security certification.
2012: Continuous 6 years of holding the "low voltage converter top ten domestic brand".
2011: Provincial electric drive engineering research center.
2010: Ministry of science and technology innovation fund for the project.
2009: National Top-new technical enterprise.
2008: "The ten major energy conservation projects".
2007: The vice chairman of the association of frequency converter enterprise.

Technical Features

Precise motor parameter self learning

- Motor parameters can be comprehensive self-study (rotary self learning) or still learning (motor) with the occasion of the load cannot escape, convenient debugging, simple operation, provide higher control accuracy and response speed.

Instantaneous power off don't stop function

- When grid instantaneous drops or outages, inverter can borrow feedback energy and keep running without stop in effective time, especially suitable for the equipments which needs higher continuity, such as textile production line, chemical fiber.

Meet the international standard of wide voltage input range

- Rated voltage: 3phase 380-480v 50Hz/60Hz
- Allow voltage float range: rated voltage ±15%.
**Technical Features**

**Superior performance in motor drive**

**Advanced motor drive technology**
- A variety of motor drive technology, no matter asynchronous motor or synchronous motor, it can implement high-performance current vector control. (e.g. normal asynchronous motor Y2 series, Frequency conversion motor with encoder or W/O encoder, asynchronous servo motor, permanent magnet synchronous motor etc.).

**Steady speed precision, wide speed range**
- Open-loop steady speed precision <0.5%
- Adjust speed range: 1:100 (open-loop vector control), 1:1000 (close-loop vector control), Torque response: <20ms (open-loop vector control), <5ms (close-loop vector control)
- Heavy load overload capacity: 110% rate stable operation (110% continuously operation), 150% rate load 1min, 180% rate load 5s.

**Low speed with high torque, small torque ripple**
- Stable torque output, high torque with low frequency, to realize the stable load of low speed 0.01Hz, torque mode and speed mode can be convenient to switch
- In close-loop vector control, linear torque linearity deviation within 3%

**Anti-corrosion paint spraying process**
- High protection design, use the import anti-corrosion paint, moisture proof, dustproof, oil proof, corrosion resistance, improve the product reliability, 3D painting, no dead angle

**Thermal reliability of the machine**
- Adopted high precision thermal simulation software, ensuring the thermal reliability of the machine.
- P1500 series inverter, all must go through thermal simulation test. Thermal design is scientific simulation tested, good accuracy, quick efficiency, good stability, especially in the condition of limit test, thermal simulation can replace the actual load test simulation, equivalent to more than a layer of scientific thermal test

**Machine temperature rise test**
- The full series of frequency converter had done the rated load temperature rise test and overload temperature rise test, test results accord with thermal design safety margin, ensure safe and stable operation of the converter.
**Technical Features**

**EMC Design specifications Improved**
- EMC built-in a set of safety capacitance, optional external capacitance group, simple filter, optional filter schaffner can meet C2 international standards
- Using professional grounding pile design, convenient grounding and weaken the electromagnetic interference
- At the scene of the bad to actual application provides EMC filter, common mode rejection, simple filter configuration of a complete set of plan, optimize the environment of EMC electric field devices

**Meet a number of certification standards**
- Product is suitable for <Technical coordination and standardization methods> requirements.
- Meet the ROHS directive

**Independent air duct design**
- Independent air duct design, the effect of heat dissipating is better, improve the reliability, which can effectively prevent dust into the converter internal to avoid short-circuit fault etc
- Select longevity’s deadly air cooling fan, effectively reduce the temperature rise of frequency converter, inverter reliable and stable operation

**Technical Features**

The advanced function of changing the class of machines

- The compact design to improve the speed of realizing machines minimizing
  - Collect the minimum frequency inverter with small and light synchronous motor to speed up the machines minimizing;
  - Selecting the long life, big wind cooling fans, new generation IGBT module technology , high efficiency of power, reducing the temperature rise of frequency inverter efficiently, make sure the frequency inverter run steadily.

**Over-excitation function**
- Fast braking and easy operating without any other pariphery braking resistor, etc;
- Inhibit the increasing of DC-bus voltage while deceleration, avoid the frequent err, and fast braking, fast stop.

**Various kinds of terminals functions, easier for operation**
- There are 51 kinds of multi-function terminals DI, 41 kinds of DO, and 16 kinds of AO logical function choices, and meet general purpose frequency inverter normal requirements.
- AI can be used as multi-function terminals DI freely;
- Al1~Al3 can be set 4 respectively polylines and five kinds of curves corresponding relationship separately, support the client to adjust the EXW parameters with the site, expanded AI3 is isolated inputs, support PT100 or ±10 V input, easily operation;
- Good5 groups of built-in analog DI and DO function choice, reducing external DI/DO cables, D1S high-speed pulse input terminal and FM high-speed pulse output terminal support the highest 10kHz pulse.
**Technical Features**

**Long life design**
- Adopting the first class manufacturers of rectifier bridge and IGBT, higher configure, greater device selection, and monitor all the temperature rise of key components and pcb board;
- Big temperature rise range, longer life;
- Vibration test to make sure the safety of transportation design;
- Internal logistic management(bar code technology, RF technology);
- Sheet Metal design, adopting Cold-rolled steel and galvanized sheet and powder spraying process on the cover.

**Supporting various kinds of installation ways**
- Wall-mounted, flange installation is available for 7.5-110kw (flange mounting needs peripheral accessories);
- Wall-mounted, flange installation, floor installation is available for 132-220kw (flange mounting, floor installation needs peripheral accessories);
- Wall-mounted, floor installation is available for 250-400kw (floor installation needs peripheral accessories);
- Floor-mounted is available for 450-630kw.

**Great environment friendly function**

**New generation energy saving running**
- Adopt the advanced energy control technology;
- With the energy control technology to realize the high efficient running of motor;
- Super energy saving while running with synchronous motor;
- Super energy saving while running with synchronous motor, better than asynchronous motor realize the super energy saving;
- ROHS approved, all components are environment friendly, no harm to people, no pollution.

**Simple maintenance**
- Fan can be disassembled, easy to install, clean and replace.
Technical Features

Built in self-adjusting PID function module
- Built in two groups of PID parameters, it is changeable automatically according to the deviation, Differential, frequency, various given and feedback source, variable and practical type. PID feedback lost inspection function, it is convenient for user to inspect the fault function;
- Setting factory parameters for special fields to meet the requirements, such as Printing and package, drawing machine, cables etc. These sites are influenced by changeable diameters, simplify the debugging process, and easy to maintain the device.

Easy to use PC software
- Easy to use PC monitoring software, enables tracking and fault location, and with oscilloscope function, it’s more convenient for clients to program, debug, real-time monitoring is very good for analyzing and management.

Communication interface application is very flexible
- Support Modbus RTU, CANopen, Profinet-DP bus protocol;
- Through a dedicated distribution point of the inverter parameters, to realize a good multi-level load distribution, multi-machine control applications drop.
### Standard Specification

<table>
<thead>
<tr>
<th>Item</th>
<th>Function</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated voltage level</td>
<td><strong>AC 3PH: 480V (+10%); 440V (+10%)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>AC 3PH: 230V (+10%); 220V (+10%)</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>AC 3PH: 220V (+10%)</strong></td>
<td></td>
</tr>
<tr>
<td>Input frequency</td>
<td>50/60Hz</td>
<td></td>
</tr>
<tr>
<td>Allowable fluctuation</td>
<td>Voltage continued volatility: ±10%</td>
<td>input frequency volatility: ±5%</td>
</tr>
<tr>
<td></td>
<td>Voltage unbalance rate less than 3%</td>
<td>Distortion meet IEC 61800-2 standard</td>
</tr>
<tr>
<td>Control system</td>
<td>High performance vector control inverter</td>
<td>Based on IEC61800-2 standard</td>
</tr>
<tr>
<td></td>
<td>Based on IEC61800-2 standard</td>
<td></td>
</tr>
<tr>
<td>Control method</td>
<td>VPF control, vector control W/O PC, vector control W/PC</td>
<td></td>
</tr>
<tr>
<td>Automatic torque boost function</td>
<td>Linear low frequency (1Hz) and large output torque control under the V/F control mode</td>
<td></td>
</tr>
<tr>
<td>Acceleration/deceleration control</td>
<td>Straight or S-curve mode. Four times available and time range is 0.0 to 8500.0s.</td>
<td></td>
</tr>
<tr>
<td>V/F curve mode</td>
<td>Linear, quadratic, n-th power, cubic V/F curve</td>
<td></td>
</tr>
<tr>
<td>Overload capability</td>
<td>G-type rated current: 150% - 1 minute, rated current: 180% - 2 seconds</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F-type rated current: 120% - 1 minute, rated current: 160% - 2 seconds</td>
<td></td>
</tr>
<tr>
<td>Maximum frequency</td>
<td>Vector control: 0 to 300Hz; V/Control: 0% to 200Hz</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.5 to 18kHz automatically adjust carrier frequency according to the load characteristics.</td>
<td></td>
</tr>
<tr>
<td>Carrier Frequency</td>
<td>Digital setting: 0-1kHz+1kHz setting: maximum frequency: 0.1%</td>
<td></td>
</tr>
<tr>
<td>Frequency resolution</td>
<td>0.1kHz</td>
<td></td>
</tr>
<tr>
<td>Start torque</td>
<td>G-type: 0.8 to 10% (vector control W/O PC); F-type: 0.8 to 10% (vector control W/PC)</td>
<td></td>
</tr>
<tr>
<td>Speed range</td>
<td>1.000 (vector control W/O PC); 1.000 (vector control W/PC)</td>
<td></td>
</tr>
<tr>
<td>Vector control W/O PC</td>
<td>Vector control W/PC &lt; 0.05% rated synchronous speed.</td>
<td></td>
</tr>
<tr>
<td>Torque response</td>
<td>4N.m (vector control W/O PC)</td>
<td></td>
</tr>
<tr>
<td>Torque boost</td>
<td>Automatic torque boost: Manual torque boost (1% to 30%)</td>
<td></td>
</tr>
<tr>
<td>DC braking</td>
<td>DC braking frequency: 2.4Hz to max. Frequency: braking time 0.0 to 30.0 seconds, braking current 1.0.</td>
<td></td>
</tr>
<tr>
<td>Jogging control</td>
<td>Jogging frequency: 2.5 to 30.0Hz to max. Frequency: jogging time 0.0 to 30.0 seconds, jogging current 1.0.</td>
<td></td>
</tr>
<tr>
<td>Multi-speed operation</td>
<td>Achieve up to 16-speed operation through the control terminal</td>
<td></td>
</tr>
<tr>
<td>Built-in PID</td>
<td>Easy to realize closed-loop control system for the process control</td>
<td></td>
</tr>
<tr>
<td>Automatic voltage regulation (AVR)</td>
<td>Automatically maintain a constant output voltage when the voltage of electric grid changes.</td>
<td></td>
</tr>
<tr>
<td>Excessive feature</td>
<td>S documentary to torque is automatically limited during the operation to prevent frequent occurrence of the closed-loop vector mode is used to control torque.</td>
<td></td>
</tr>
</tbody>
</table>

### Standard Specification

<table>
<thead>
<tr>
<th>Item</th>
<th>Function</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Running</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Running method</td>
<td>Keyboard/final communication</td>
<td>10-Year warranty available, including adjustable DC-0 to 15V, 15V to 15V, adjustable DC-0 to 30V, panel thermostat</td>
</tr>
<tr>
<td>Frequency setting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Start signal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency stop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wobble state</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fault reset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PID feedback signal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slotted control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Running status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Run function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC current testing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Running command channel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency source</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Input terminals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output terminals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overvoltage protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under-voltage protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over-current protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current/voltage protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulation protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excessive feature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IGBT temperature display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inverter fan control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instantaneous power-down restart</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Speed start tracking method</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameter protection function</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LED/LCD display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error message display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Display keyboard</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LED display</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameters copy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Key lock and function selection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RS485</td>
<td></td>
<td>The optional completely isolated RS485 communication module can communicate with the host equipment.</td>
</tr>
<tr>
<td>Environment temperature</td>
<td></td>
<td>-10°C to 40°C (temperature at 40°C to 50°C, please derating for use)</td>
</tr>
<tr>
<td>Storage temperature</td>
<td></td>
<td>-20°C to 85°C</td>
</tr>
<tr>
<td>Environment humidity</td>
<td></td>
<td>Does not exceed 95% R.H. (no condensation of moisture)</td>
</tr>
<tr>
<td>Vibration</td>
<td></td>
<td>Below 6.9mm/s (1.6g)</td>
</tr>
<tr>
<td>Application sites</td>
<td></td>
<td>Indoor where no gasoline or corrosive, explosive gas and water, dust, flammable gas, oil, water vapor, shop or salt, etc.</td>
</tr>
<tr>
<td>Altitude</td>
<td></td>
<td>Above 1800m</td>
</tr>
<tr>
<td>Pollution degree</td>
<td></td>
<td>IP26</td>
</tr>
<tr>
<td>Cooling method</td>
<td></td>
<td>Forced air cooling</td>
</tr>
</tbody>
</table>
Operating keyboard
(button key description)

Installation

Installation direction and Vacancy

P1500 series inverter, according to different power rating, the requirements of around installation and reserved space is different, specifically as shown below:

<table>
<thead>
<tr>
<th>Mounted vertically up</th>
<th>Dimension requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.5～22KW</td>
<td>A≥200mm; B≥10mm</td>
</tr>
<tr>
<td>30～75KW</td>
<td>A≥200mm; B≥50mm</td>
</tr>
<tr>
<td>93～400KW</td>
<td>A≥300mm; B≥50mm</td>
</tr>
</tbody>
</table>

P1500 Series frequency inverter heat radiator circulated from bottom to top, when more than one inverter work together, usually mounted side by side. In the case of the need to install them by upper and lower rows, due to the heat of the lower inverters rising to the upper equipment, fault maybe caused, heat insulation deflector and other objects to be installed.

Use of the environment

1. Environmental temperature -10°C to 50°C. Above 40°C, the capacity will decrease 3% by each 1°C. So it is not advisable to use inverter above 60°C.
2. Prevent electromagnetic interference, and away from interference sources.
3. Prevent the ingress of droplets, vapor, dust, dirt, lint and metal fine powder.
4. Prevent the ingress of oil, salt and corrosive gases.
5. Avoid vibration. Maximum amplitude is less than 5.9m/s² (0.6g).
6. Avoid high temperature and humidity or exposure to rain, humidity shall be less than 90% RH (non-condensing).
7. In the presence of corrosive gas, maximum relative humidity is no more than 60%.
8. Altitude below 1000 meters.
9. Never use in the dangerous environment of flammable, combustible, explosive gas, liquid or solid.

Wiring

Frequency inverter wiring is divided by main circuit and control circuit. Users must properly connect frequency inverter in accordance with the wiring connection diagram showing below.
**Peripheral equipment**

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protect frequency inverter wiring</td>
<td>Wiring breaker or leakage</td>
<td>To protect frequency inverter connection, please set wiring breaker or leakage protector by the site of power supply. Please use preventing stray harmonic leakage protector.</td>
</tr>
<tr>
<td>Prevent braking resistor burning-out when connecting</td>
<td>AC reactor</td>
<td>To prevent braking resistor burning-out when connecting, please set AC reactor. Use 3-pole AC reactor to connect surge absorber on the coil.</td>
</tr>
<tr>
<td>Preventing switching surge leaking out</td>
<td>Surge absorber</td>
<td>Surge absorber absorbing electromagnetic contactor and control relay switching surge, drive-inlet surge absorber on the coil.</td>
</tr>
<tr>
<td>Isolation input/output signal</td>
<td>Isolator</td>
<td>Due to frequency inverter insulation input/output signal, isolator can reduce inductive interference effectively.</td>
</tr>
<tr>
<td>Improve frequency inverter input power factor</td>
<td>DC reactor/AC reactor</td>
<td>Apply to improve frequency inverter input power factor, please set DC reactor or AC reactor, where DC reactor has higher input power.</td>
</tr>
<tr>
<td>Reduce noise disturbance</td>
<td>Input noise filter</td>
<td>Input wiring can reduce noise into frequency inverter input power supply system. Power signal is filtered by frequency inverter.</td>
</tr>
<tr>
<td>Machine stop running on setting time</td>
<td>Braking resistor</td>
<td>Braking unit will consume electric energy, which will reduce decrease time.</td>
</tr>
<tr>
<td>Control frequency inverter operation</td>
<td>Operator (standard)</td>
<td>Control frequency setting and operation/motor operation by analog quantity instructions from distance.</td>
</tr>
<tr>
<td>Ensure frequency inverter sudden power failure compensation</td>
<td>Sudden power failure compensation unit</td>
<td>To control power supply sudden failure compensation.</td>
</tr>
<tr>
<td>Setting and monitoring frequency from outside</td>
<td>Frequency setting device</td>
<td>Outside setting and monitoring frequency device.</td>
</tr>
<tr>
<td>Adjust frequency instruction input and frequency meter, amperes meter full scale</td>
<td>Frequency meter</td>
<td>Frequency instruction using frequency monitor. Install and control circuit terminal, input frequency instruction.</td>
</tr>
<tr>
<td>Adjust frequency meter and amperes meter full scale</td>
<td>Frequency meter</td>
<td>Frequency meter and amperes meter full scale.</td>
</tr>
</tbody>
</table>
Some application cases

**Coal Mining Industry**
- engine analyzer, slitting pot carrier, feeding machine, iron ladle motor, fireproof door motor, ore washing pump
- suction fan in the pit, air supply system, hauling machine

**Hoisting Industry**
- mine hoist, mining electric locomotive port, hoist, building lift, pile driver, crane motor, tower crane, lifting

**Petroleum Industry**
- plunger pump, beam pumping unit, oil transfer pump, gas transmission pipeline system compressor

**Chemical Industry**
- vacuum kneader (agitator) dryer, film blowing machine, plastic mill, pulverizer, drafting device for short fiber, high-speed spinning machine, for chemical fiber feedstock pump for oil refinery, pump for cooling unit

**Iron & Steel Industry**
- winding engine for iron-making blast furnace, dust removing blower for blast furnace, air blower for blast furnace gas blinding blowing engine, roots blower for digital thermometer, variable frequency exhaust fan for steel furnace roasting and purging fan, hot rolling machine, cold tandem rolling mill, feeding system, mill exhauster, winding machine, wire drawing machine, winding machine, blend mixer, drying machine, slide pump, drawing pump, water supply pump, unbinder, pipe winding machine, trolley crane motor

**Power Industry**
- boiler blower, induced draft fan, boiler feeding pump, circulating water pump, air pressure drain pump, condensate pump, cooling water pump, motor pump, oil feeder

**Textile Industry**
- spinning machine, bagging machine, winding machine, knitting machine, centrifugal dye bath, spinning frame, relaxation machine for print works, tensioning and tempering machine, bobbins, outer-drying machine, decorating machine, blending machine, drying jiggers

**Fan Industry**
- centrifugal compressor, axial-flow compressor, centrifugal blower, Roots blower, centrifugal fan, axial flow fan, inline blower

**Machine Tool Industry**
- high-speed spindle, vertical spindle, surface grinding machine, boring machine, spindle, sewing machine

**Injection Molding Machine**
- extruding machine, injection machine, drive motor, internal mixer, granulate machine

**Pump**
- petroleum pump, metallurgical pump, chemical pump, fish pump, mining pump, power pump, water conservancy pump, sewage pump, food pump, brewing pump, pharmacy pump, beverage pump, fuel pump, condensation pump, paper pump, textile pump, printing and drying pump, ceramic pump, paint conveyor pump, agricultural chemical pump, fertilizer pump, sugar-syrup pump, medicine pump, spray pump, salt pump, beer pump, sleigh pump, lead pump

**Winding Machine**
- lithium battery winding machine, capacitor core winding machine, textile winding machine

**Conveyor Belt**
- belt-type conveyor, plate conveyor, car type conveyor, escalator, passenger conveyor, scraper conveyor, elevator, bucket conveyor, bucket elevator, undercarriage conveyor, understoried conveyor

**Heating System**
- constant pressure water supply system for boiler, mill, extruder, ball conveyor for coal, coal breaker, air blower, induced draft fan, cold rolling mill

**Compressor**
- piston compressor, screw compressor, centrifugal compressor, linear compressor

**Photovoltaic**
- microwave relay station, optical cable communication system, wireless paging, station, satellite communication and satellite television receiving system, computerized telephone system in country, radio communication system in locomotive, railway and highway signage system, lighthouse and beacon light, meteorological station, seismic station

![Image of some application cases](https://www.powtran.com)