The 6000 Series New Firmware & Temperature Hub and Sensors

TECHNICAL WHITE PAPER

The 6000 series purge and pressurization system has several major feature enhancements. Firmware version EPCU 3.10/ UIC 2.02 will function identically to previous versions and is backwards compatible. This paper explains the major updates. The user can more efficiently use the 6000 purge and pressurization system and outline the new temperature control products.

Kristen Barbour
Product Marketing Manager
Monitoring and Protection

Chris Romano
Product Portfolio Manager
Purge and Pressurization

PEPPERL+FUCHS
PROTECTING YOUR PROCESS

EPCU: Software Revision 3.10
UIC: Software Revision 2.02

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New Firmware & Temperature Hub and Sensors

Introduction:

The 6000 series purge and pressurization system has several major feature enhancements. Firmware version EPCU 3.10/ UIC 2.02 will function identically to previous versions and is backwards compatible. Firmware revision number is located in the 'STATS' 6000 menu. This paper explains the major updates. The user can more efficiently use the 6000 purge and pressurization system and outline the new temperature control products.

Automated monitoring and control of enclosure pressure

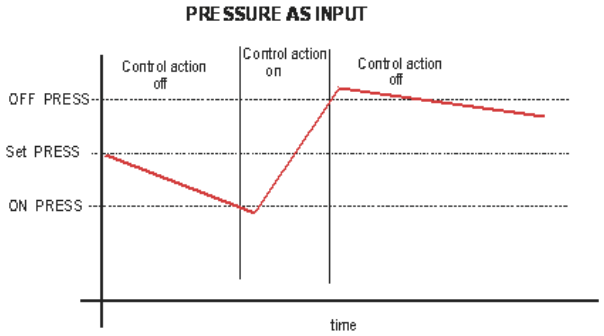
Pressure as an input:

A mechanical needle valve is typically used to control enclosure pressure. It is capable of compensating minor leakages and should stay at the set pressure during normal conditions. There are, however, causes of enclosure pressure variations or changes for which a needle valve cannot correctly compensate:

- Variations in the line pressure
- Seals on the protected enclosure begin to age
- Temperature changes cause seals to expand/ contract
- Conduit seals, cable glands or panel mounted devices become loose
- Printer door opens to retrieve paper copy – temporary loss of pressure

The problem is that once the needle valve is set; there is no automatic adjustment for changes of these parameters. The automatic pressure input function allows the user to set the enclosure pressure between a max. and min. pressure level. This pressure range allows compensation for pressure changes and can engage the rapid exchange valve until the pressure reaches the max. value and then shuts off. This keeps the pressure variations from shutting off the power to the enclosure. This action could also initiate a control relay to energize a secondary pressure source. A low-pressure alarm will announce when the system is working in an abnormal conditions. When the minimum and maximum values are added to the unit, the system will compensate for these changes without disruption to the system.

In the new firmware, under setup, the 'INPUT SETTINGS' section now includes the selection of controlling pressure within the enclosure by opening and closing a digital valve or manifold on the 6000 control unit. These two internal pressure set points can be controlled by the manifold or an outside source for pressure, like a bottle reserve tank. The pressure function can manage the control outputs 1 or 2, or the control valve (manifold valve).



- The 'ON PRESSURE' is the lowest pressure you want in the enclosure and will start the control action on when pressure goes below this value
- The 'OFF PRESSURE' is the valve shut off point. When the pressure is between these two values then nothing will happen
- The 'ON PRESSURE' function is active until the 'OFF PRESSURE' is reached
  This function does not operate during purging cycle and only after purging and pressurization
- The 'ON PRESSURE' always has to be lower than the 'OFF' pressure and this cannot be reversed

Automated monitoring and control of enclosure temperature

New temperature inputs:

Electrical components within an industrial enclosure generate heat. The installation location of the enclosure can cause additional heat or cooling problems. Many times the enclosure has to be vented or the addition of cooling/ heating systems is required. This presents a problem if you want to keep the enclosure sealed or use it in a hazardous area.

In hazardous areas, the heating of equipment not only could be fatal to the equipment inside but also could elevate the temperature to a level that could ignite the hazardous atmosphere. Adding an air conditioner and/ or heater can be expensive because this equipment must be rated for the classified areas. Hazardous-rated air conditioners recycle the air inside the enclosure and can not draw air from the hazardous area. Vortex coolers can be a simple and inexpensive method; however, it could add moisture or excess noise generated by the vortex.

Sources of temperature issues:

- Equipment within the enclosure generating heat
- Outside environment requires heating or cooling
- Equipment requires cooling before opening door
- Equipment failure (motors) generating abnormal heating
- Keeping equipment below a T-code

Some solutions for controlling the temperature within an enclosure are:

- **Vortex coolers** are mechanical, so they will always be on. This means there is no control and it will always be circulating cold air into the enclosure. Some Vortex coolers do have a thermostat with a solenoid valve for turning on and off for control. The solenoid valve is mounted outside the enclosure so it must be rated for the area (Ex). Another problem associated with vortex coolers moisture inside the enclosure if the unit is not filtered properly.

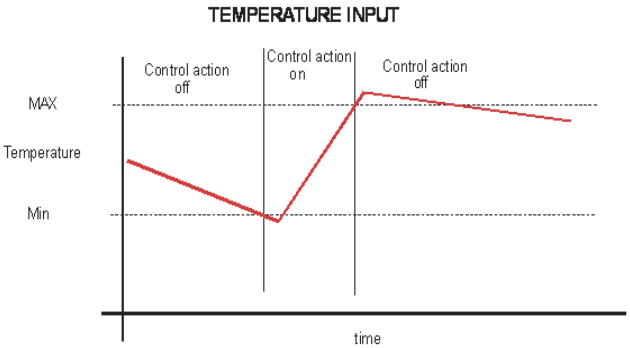
- **Air conditioners / heaters** work great, but they add cost, they take up space, and they must be rated for the area.

- **Air Flow** The purge system needle valve, or the system that compensates for leakages in a purge system can be turned up so that it continuously flows through the vent and cools the inside of the enclosure. This is not control and is wasteful of the protective gas supply and energy (especially if it is nitrogen).

- **Internal fans** can only circulate what is inside the enclosure. Some heat dissipation can happen through the enclosure walls and an additional heat sink could be used. The fan and heat sink will only have a minimal effects and will not control the variations in cooling and heating.

New Firmware & Temperature Hub and Sensors

The 6000-TEMP-01, the new temperature hub, and the 6000-TSEN-01, the new external temperature sensors, are used with the 6000 Purge and Pressurization system. The programming menu in the 6000 control unit now allows averaging or maximum temperature input reading from the sensors to control a solenoid valve or activate the auxiliary relay to cool or heat the enclosure, or it can be used to warn of temperature problems.



Low Temperature Control

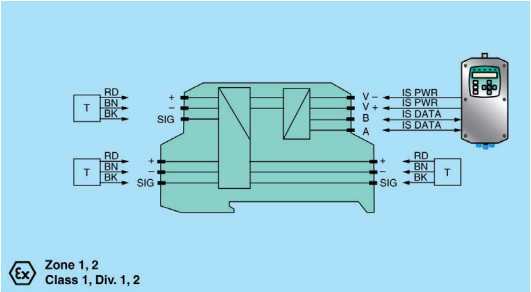
In the programming menu under SENSOR SETUP, EXT SENSOR COUNT allows up to three sensors to be configured to one temperature hub. The temperature hub inputs are designed to work only with our new Pepperl+Fuchs temperature sensors.

Each temperature hub has one embedded temperature sensor. In the programming menu under 'INPUT SETTINGS' you will select the HUB, this must be selected if you want to include the HUB as a sensor input.

- Why would you not want it as a temperature input? One reason could be that the hub could be located elsewhere in the process and away from the device being monitored for temperature.

The next function is TEMP INPUT 1 and TEMP INPUT 2. These are the same except you can have TEMP INPUT 1 have different control actions than TEMP INPUT 2. Once a CONTROL ACTION is selected then select SETPOINT TYPE for the AVERAGE or SINGLE PT. If multiple sensors are used then you can control action to happen during peak or average temperature of the sensors.

ON SET POINT and OFF SET POINT are the temperatures for the control action. Unlike the pressure inputs the ON SET POINT can be greater or less than the OFF SET POINT.



Temperature hub and three sensors connected to the 6000 control unit

Inverted intrinsically safe inputs:

Some users have a normally closed contact for their input to the 6000 series and are not able to use them to one of the four intrinsically safe inputs the 6000 unit supplies. This option of inverting the input will allow customers to use normally closed contacts. For example, the normally closed contacts can be a switch to announce the enclosure door opening. When the door is opened, the switch opens, and the purge system shuts down and announces that the door is open. This programming function is in the INPUT SETTINGS.

Language:

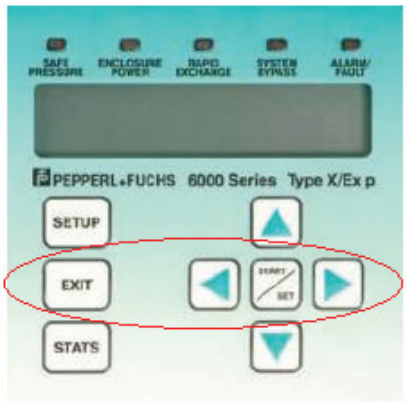
Spanish and French languages have been added as an option for the programming menu. This is selectable during the first start-up of the unit or can be changed by entering the 'SETTINGS' and changing it.
This programming function is in the 'LANGUAGE' section

Statistics:

We have added temperature stats for existing temperature, min. and max. and have updated the fault and alarm actions.

EPCU reboot without a power disconnect:

There were two ways to remove power to the EPCU unit. One is to open the explosion proof enclosure that houses the EPCU and disconnect the removable power terminals. This can be difficult to do when the control unit is mounted in a hazardous area where the removal of the explosion proof enclosure is not allowed. The other way is to find the disconnect switch on the EPCU and turn it off. This is also difficult when the disconnect switch will also shut down power to something that is running on a production line. The EPCU can now be rebooted without disconnecting the power.



Using a keyboard sequence, simultaneously pressing: | EXIT | ◄ | START/STOP | ► | power will be interrupted to the EPCU and it will reset. All user-programmed functions will be saved, but the unit will reboot and then go through its procedure to energize the enclosure.

New Firmware & Temperature Hub and Sensors

Bypass enable:

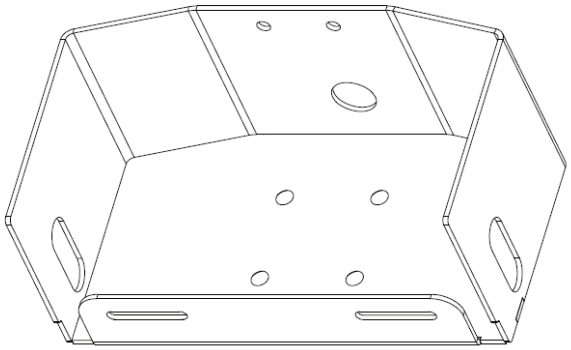
Under normal operating purge conditions when power is cycled on the control unit, the bypass switch is inoperable until the user goes into the settings and enables the bypass feature. We have implemented a new option that will leave the bypass enabled when power is cycled. This is very useful for systems that use INPUT 1 with a key switch. Without this option, when the power is cycled, then the bypass switch is inoperable until the user goes into the settings and enables the bypass feature. This allows for a power cycle, purge cycle without going back into the settings and re-setting the enable bypass option. This new option does not allow power to the enclosure to be turned on before purging is complete, but allows the user to bypass the system after purging. This is optional setting is available in the programming menu under BYPASS CONTROL.

Model number for second vent system:

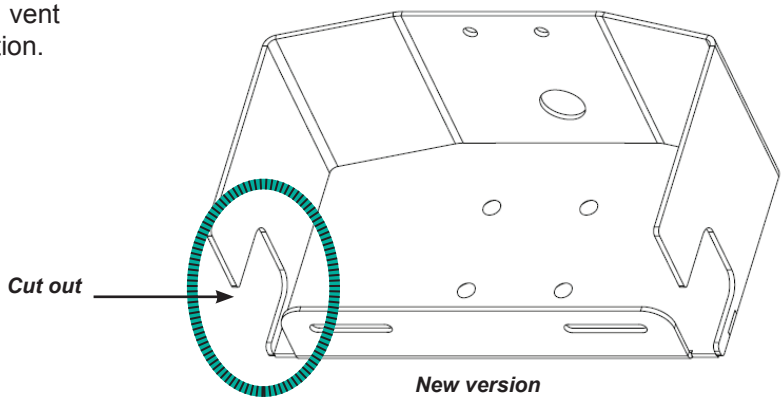
The EPV-6000 vent communicates digitally to the control unit. When two vents are connected to one control unit, the address of one of the second vents has to be changed. It was labor intensive to change the address and required the user to loosen the four bolts on the connector side and change the position of the two PCB mounted switches. This procedure has been eliminated with the new model and part number for the second vent: EPV-6000-AA-02 and EPV-6000 SS-02. The '02' indicates the second vent and its address, which eliminates the PCB modification.

Manifold slot for easy installation:

A new manifold housing was made to make it easier to install the system. The previous manifold system involved tightening the fittings after it was installed in the enclosure and the manifold put in place. If the fittings were put on backwards or the assembly had to be removed; the tubing protruded from the manifold plate and would have to be cut. To correct this issue we cut away a section of the manifold cover so that it can easily slip off without interrupting the fittings or removal of them.



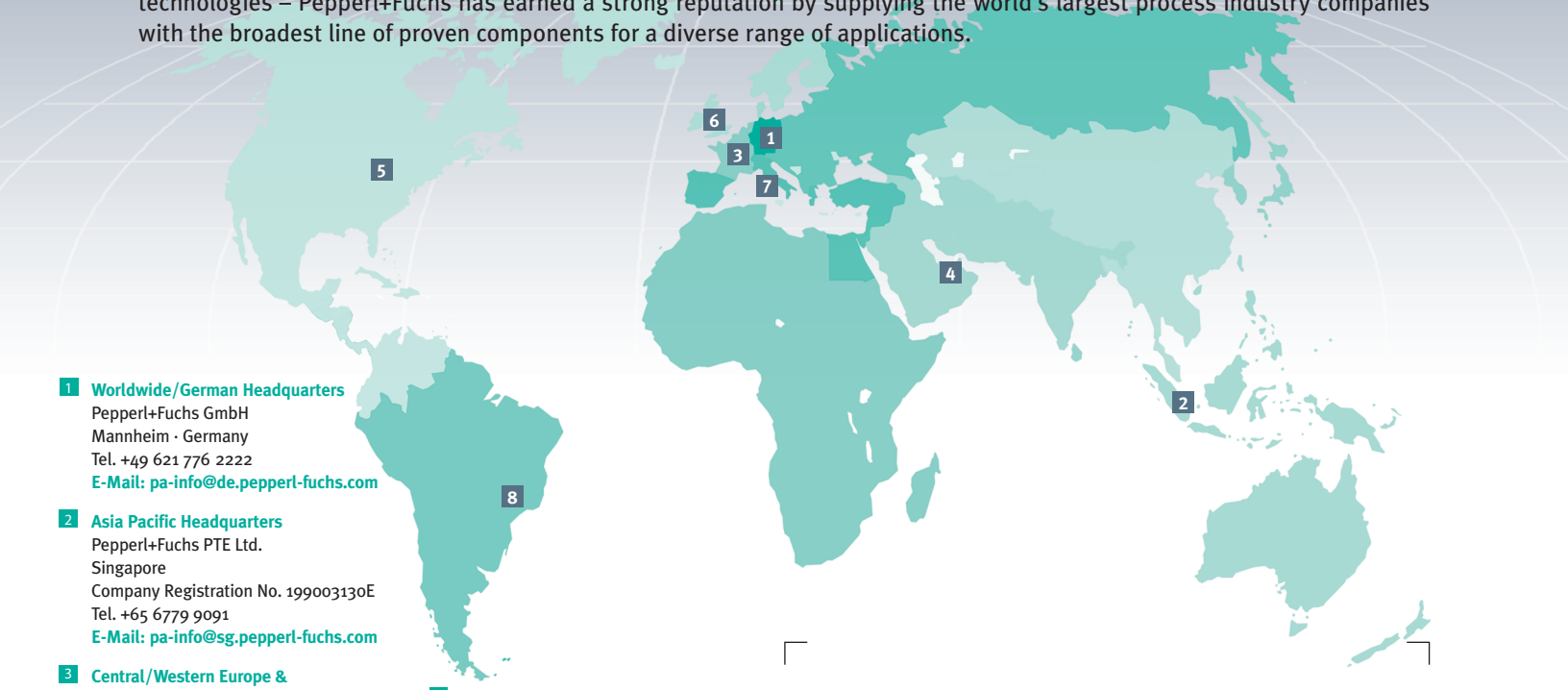
Previous version



New version

PROCESS AUTOMATION – PROTECTING YOUR PROCESS

For over a half century, Pepperl+Fuchs has provided new concepts for the world of process automation. Our company sets standards in quality and innovative technology. We develop, produce and distribute electronic interface modules, Human-Machine Interfaces and hazardous location protection equipment on a global scale, meeting the most demanding needs of industry. Resulting from our world-wide presence and our high flexibility in production and customer service, we are able to offer complete individual solutions – wherever and whenever you need us. We are the recognized experts in our technologies – Pepperl+Fuchs has earned a strong reputation by supplying the world's largest process industry companies with the broadest line of proven components for a diverse range of applications.



1 **Worldwide/German Headquarters**
Pepperl+Fuchs GmbH
Mannheim · Germany
Tel. +49 621 776 2222
E-Mail: pa-info@de.pepperl-fuchs.com

2 **Asia Pacific Headquarters**
Pepperl+Fuchs PTE Ltd.
Singapore
Company Registration No. 199003130E
Tel. +65 6779 9091
E-Mail: pa-info@sg.pepperl-fuchs.com

3 **Central/Western Europe & Africa Headquarters**
Pepperl+Fuchs N.V.
Schoten/Antwerp · Belgium
Tel. +32 3 6442500
E-Mail: pa-info@be.pepperl-fuchs.com

4 **Middle East Headquarters**
Pepperl+Fuchs M.E (FZE)
Dubai · UAE
Tel. +971 4 883 8378
E-Mail: pa-info@ae.pepperl-fuchs.com

5 **North/Central America Headquarters**
Pepperl+Fuchs Inc.
Twinsburg · Ohio · USA
Tel. +1 330 486 0002
E-Mail: pa-info@us.pepperl-fuchs.com

6 **Northern Europe Headquarters**
Pepperl+Fuchs GB Ltd.
Oldham · England
Tel. +44 161 6336431
E-Mail: pa-info@gb.pepperl-fuchs.com

7 **Southern/Eastern Europe Headquarters**
Pepperl+Fuchs Elcon srl
Sulbiate · Italy
Tel. +39 039 62921
E-Mail: pa-info@it.pepperl-fuchs.com

8 **Southern America Headquarters**
Pepperl+Fuchs Ltda.
São Bernado do Campo · SP · Brazil
Tel. +55 11 4341 8448
E-Mail: pa-info@br.pepperl-fuchs.com

www.pepperl-fuchs.com

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