BCU 580

Burner control units

- For monitoring and controlling modulating or staged burners for multiple burner applications with a central air supply
- For directly ignited burners or burners ignited by a pilot burner in intermittent or continuous operation
- Optionally with valve proving system
- PROFINET fieldbus connection using optional bus module

Application

Burner control unit with plug-in spring force connection terminals

Burner control unit BCU 580 controls, ignites and monitors gas burners in intermittent or continuous operation. It can be used for gas burners of unlimited capacity which are ignited by pilot burners. The burners may be modulating-controlled or stage-controlled. Its fast reaction to various process requirements makes the BCU suitable for frequent cycling operation.

On industrial furnaces, it reduces the load on the central furnace control by taking over tasks that relate to the burner, for example it ensures that the burner ignites in a safe condition when it is restarted.

The air control on the BCU..F1, F2 or F3 assists the furnace control for cooling, purging and capacity control tasks.

The burner control unit has an interface via which an air valve or actuator (IC 20, IC 40 or RBW) can be controlled for staged or modulating burner capacity control.

The program status, the unit parameters and the level of the flame signal can be read directly from the unit. The burners or a connected control element can be activated manually using the integrated Manual mode for setting and diagnostic purposes.

Thanks to the optionally integrated valve proving system, the valves can be checked for leaks by querying an external gas pressure switch or it can be checked whether the gas valve on the inlet side is closed.

Using the BCSoft program, the parameters, analysis and diagnostic information can be read from a BCU via the optionally available opto-adapter. All valid parameters are saved on an integrated parameter chip card. The parameter chip card can be removed from the old unit and inserted into a new BCU to transfer the parameters, for example when replacing the unit.

The monitored outputs for the actuator and valves are accommodated in a plug-in power module. This can simply be replaced if necessary.

Once the plug-in power module has been removed, the parameter chip card and fuses are accessible.

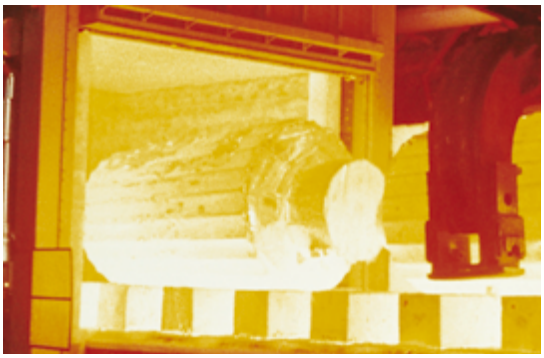
The BCU can be installed on a DIN rail in the control cabinet. Plug-in connection terminal strips on the BCU make it easier to install and remove.

Thanks to the operator-control unit OCU, display functions and operation of the BCU can be relocated to the control cabinet door.

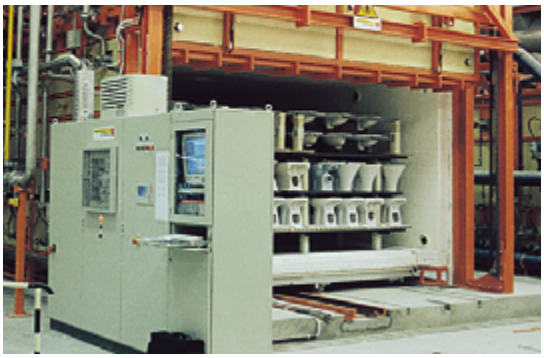
The external operator-control unit OCU is available as an option for the burner control units. The OCU can be installed in the control cabinet door instead of standard control units. The program status, flame signal or fault messages can be read on the OCU. For burner adjustment, the operating points can be approached conveniently in Manual mode using the operator-control unit.

The address for the fieldbus communication is set using three code switches.

The optional bus module BCM 500 makes it possible to connect the BCU to a PROFINET network via a fieldbus interface. Networking via the fieldbus enables multiple BCUs to be controlled and monitored by an automation system (e.g. PLC). The bus module is prepared for DIN rail installation. It is pushed on to the BCU from the side.



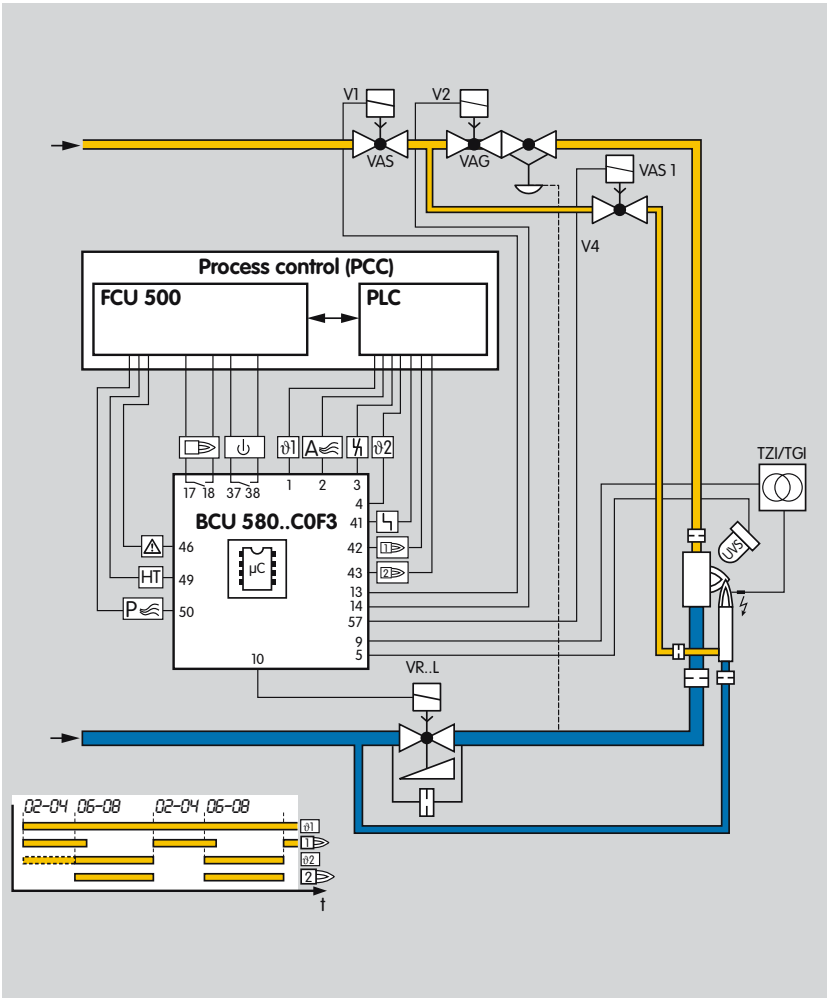
Bogie hearth forging furnace in the metallurgical industry



Intermittent shuttle kiln in the ceramics industry

Walking beam furnace with overhead firing

Examples of application



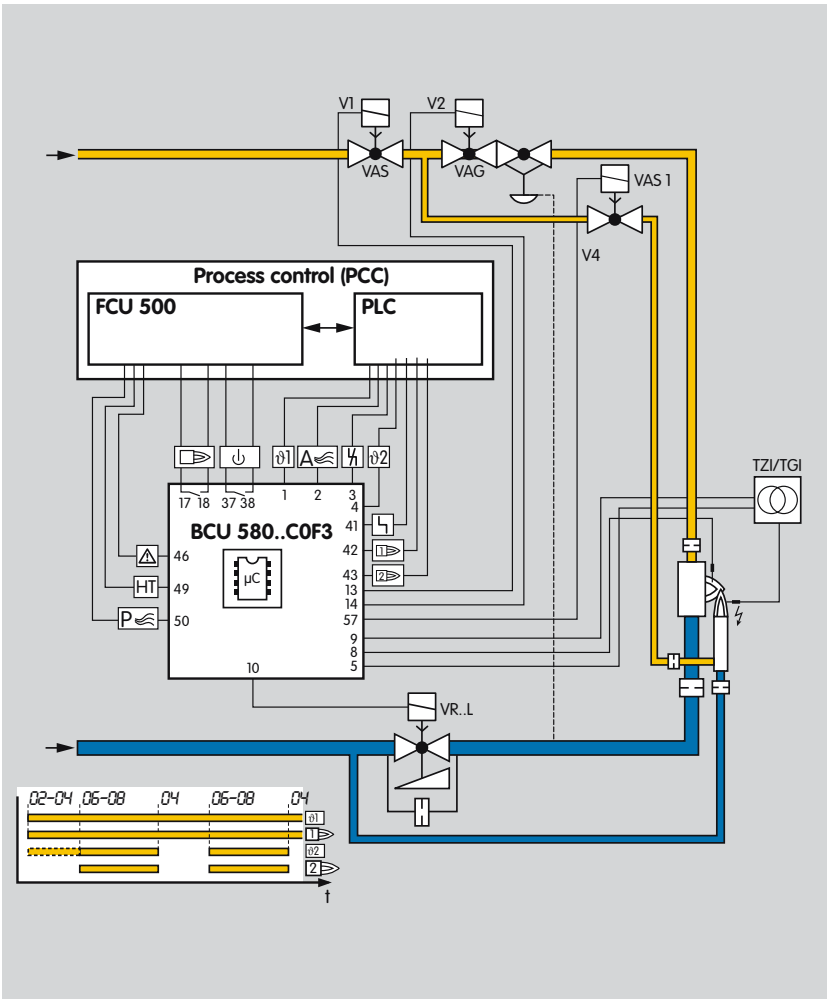
Stage-controlled main burner with alternating pilot burner

Control:
Main burner ON/OFF or High/Low

The main burner can be started with reduced capacity after the operating signal from the pilot burner has been detected. The pilot burner is switched off automatically after the main burner has started up. When the main burner is switched off, the pilot burner automatically switches on again. This reduces the main burner start-up time.

The UV sensor monitors the flame signal from pilot and main burners.

The BCU provides the cooling and purging processes.

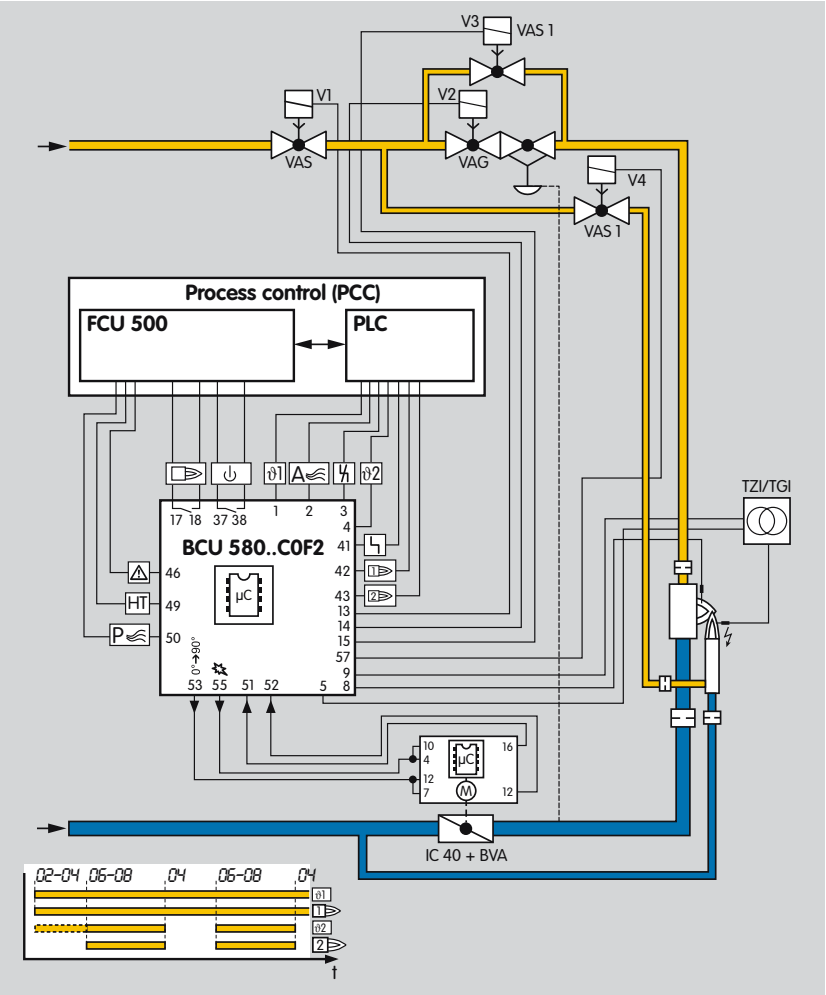


Stage-controlled main burner with permanent pilot burner

Control:
Main burner ON/OFF or High/Low

The main burner can be started with reduced capacity after the operating signal from the pilot burner has been detected. Pilot and main burners can be operated simultaneously. This reduces the time required by the main burner for starting up.

The BCU provides the cooling and purging processes.

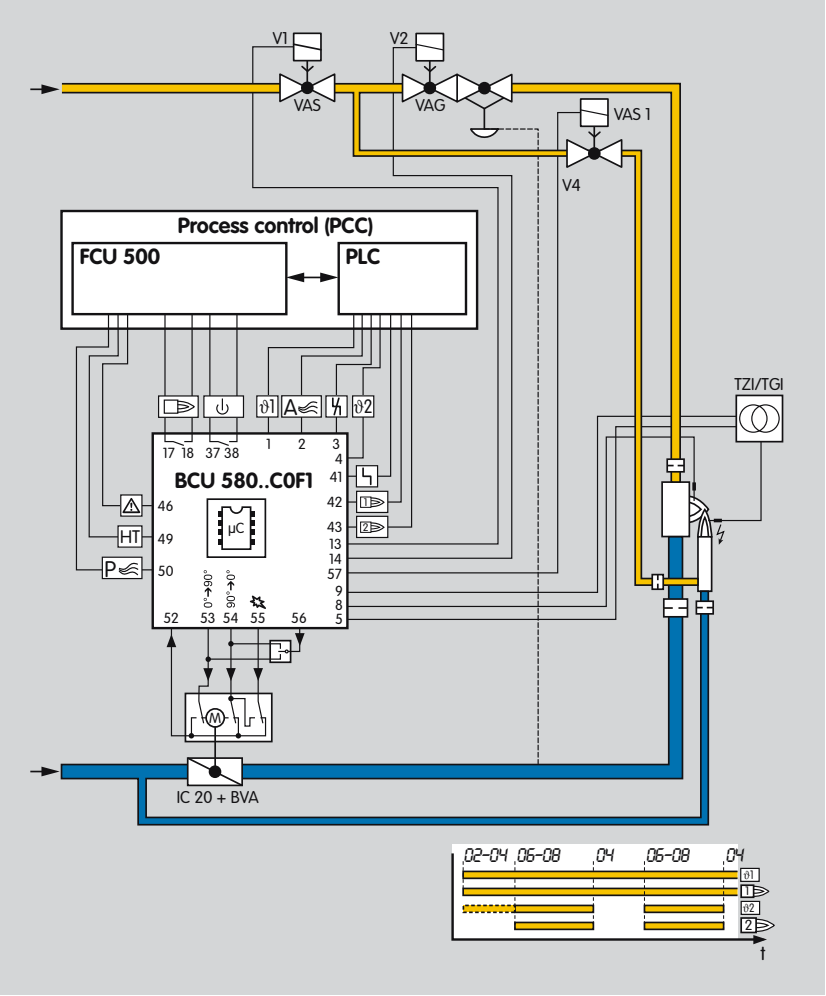


Two-stage-controlled main burner with permanent pilot burner

Control:
Main burner ON/OFF with ignition via bypass

The main burner can be started with minimum capacity after the operating signal from the pilot burner has been detected. When the operating state is reached, the BCU issues the Enable signal for the maximum burner capacity. Pilot and main burners can be operated simultaneously. This reduces the time required by the main burner for starting up.

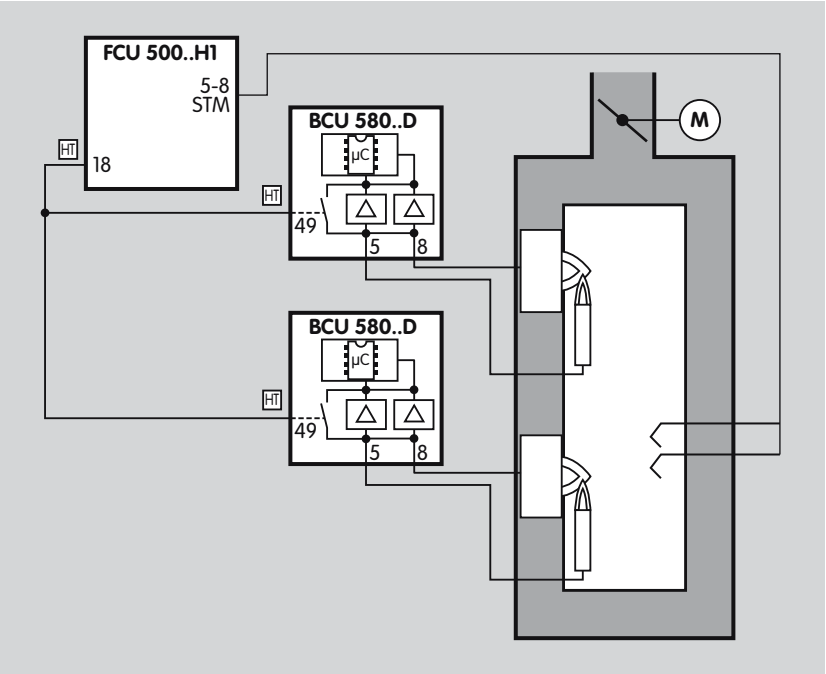
The BCU provides the cooling and purging processes.



Modulating-controlled burner

Control:
Main burner continuous

The butterfly valve for air is moved to the position for minimum capacity in order to start the main burner. The main burner is started with minimum capacity after the operating signal from the pilot burner has been detected. The control system controls the burner capacity via the butterfly valve for air after the operating state has been signalled. Pilot and main burners can be operated simultaneously. This reduces the time required by the main burner for starting up.



Flame control using the temperature

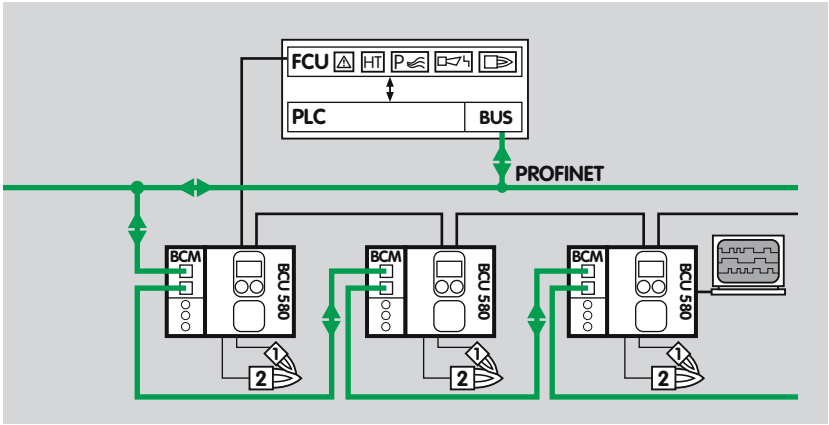
In high temperature systems (temperature > 750°C), the flame may be controlled indirectly via the temperature.

As long as the temperature in the furnace chamber is below 750°C, the flame must be controlled by conventional methods.

If the temperature in the furnace chamber rises above the spontaneous ignition temperature of the gas/air mixture (> 750°C), the FCU signals to the downstream burner control units via the fail-safe HT output that the furnace system is in High temperature mode (HT). When the HT input is activated, the burner control units switch to High temperature mode. They operate without evaluating the flame signal and their internal flame control is non-functional.

If the furnace temperature falls below the spontaneous ignition temperature (< 750°C), the FCU disconnects the HT output from the electrical power supply. As soon as the signal to the HT inputs of the burner control units is no longer present, the flame signals are once again monitored by a UV sensor or ionization electrode.

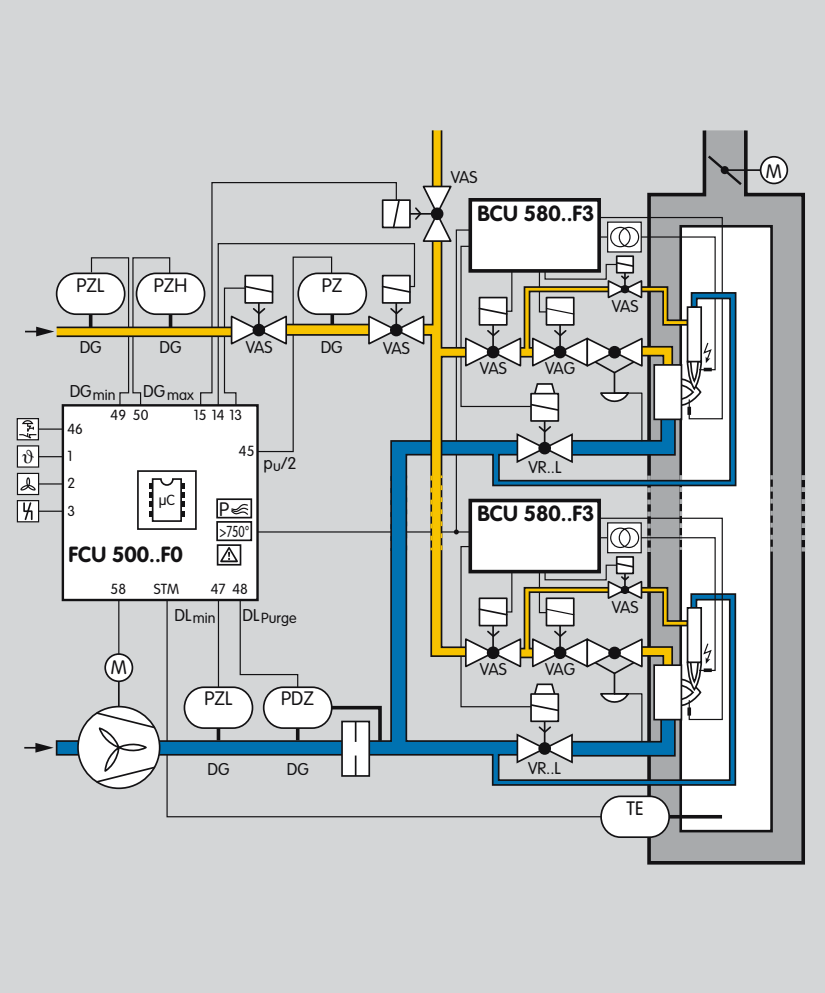
In the event of a fault in a temperature monitoring component (e.g. sensor discontinuity, sensor short-circuit) or in the event of a mains failure, the flame control task is transferred to the burner control units.

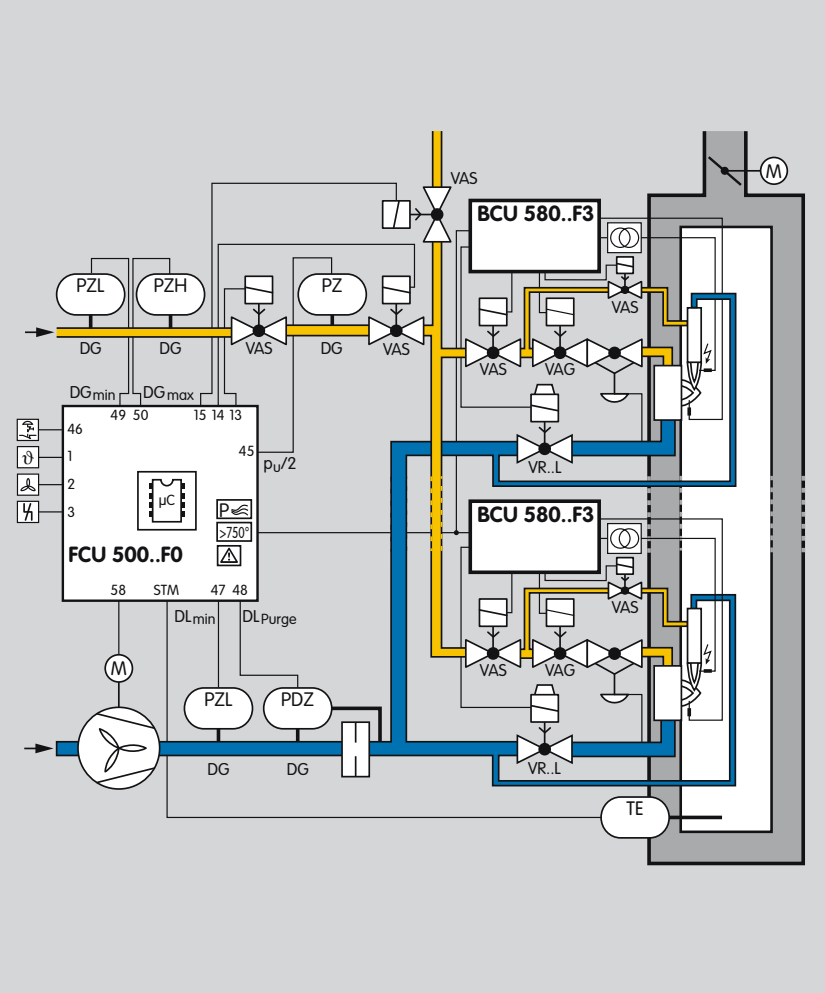


PROFINET connection using bus module BCM

The bus system transfers the control signals from the automation system (PLC) to the BCU/BCM for starting, resetting, controlling the air valve, purging the furnace or for cooling and heating during operation. In the opposite direction, it sends operating status, the level of the flame signal and the current program status.

Control signals that are relevant for safety, such as the safety interlocks, purge and HT input, are transferred independently of the bus communication by separate cables.





ON/OFF rotary impulse control

For processes which require a turndown of more than 10:1 and/or those which require heavy circulation of the furnace atmosphere to ensure a uniform temperature, e.g. heat treatment furnaces operating at low and medium temperatures in the metallurgical industry.

With ON/OFF cyclic control, the capacity supplied to the process is controlled by means of a variable ratio of the operating time to the pause time. In this type of control, the burner output pulse frequency always maintains full momentum and results in maximum convection in the furnace chamber, even with regulated heating.

The pneumatic ratio control system controls the gas pressure on the burner proportionally to the air pressure and thus maintains a constant air/gas ratio. At the same time, it acts as a low air pressure protection device.

The ignition and monitoring of the pilot/main burners is ensured by burner control units BCU 580.

The centrally checked safety functions such as pre-purge, tightness test, flow detector and pressure switch check ($gas_{min.}$, $gas_{max.}$, $air_{min.}$) are provided by the FCU 500.

Type code

Code	Description
BCU	Burner control unit
5	Series 500
80	Version for pilot and main burners
Q W	Mains voltage: 120 V AC, 50/60 Hz 230 V AC, 50/60 Hz
C0 C1	No valve proving system With valve proving system
F1 F2 F3	Capacity control: interface for actuator IC interface for RBW actuators air valve control
U0	Ionization or UV control in case of operation with gas
D0 D1	Digital input: none for high temperature operation
K0 K1 K2	No plug-in terminals Plug-in terminals with screw connection Plug-in terminals with spring force connection
E	Individual packaging

Technical data

Mains voltage

BCU..Q: 120 V AC, -15/+10%, 50/60 Hz, ±5%,
BCU..W: 230 V AC, -15/+10%, 50/60 Hz, ±5%,
for grounded or ungrounded mains.

Power consumption

At 230 V AC approx. 6 W/11 VA plus power consumption per AC input of approx. 0.15 W/0.4 VA,

at 120 V AC approx. 3 W/5.5 VA plus power consumption per AC input of approx. 0.08 W/0.2 VA.

Flame control

With UV sensor or ionization sensor,
for continuous operation (intermittent operation with UVS).

Flame signal current

ionization control: 2 – 25 µA,
UV control: 5 – 25 µA.

Signal cable for flame signal current: max. 100 m (164 ft).

Fuses

replaceable
F1: T 3,15A H,
F2: T 2A H, pursuant to IEC 60127-2/5.

Weight

0.7 kg.

Ambient temperature

-20 to +60°C (-4 to +140°F),
no condensation permitted.

Enclosure

IP 20 pursuant to IEC 529.

Maintenance

The fail-safe outputs (valve outputs V1, V2, V3 and V4) of the power module are monitored for correct functioning. In the event of a fault, the system is set to a safe status using a second shut-down method (isolation of the valve outputs from the mains). In the event of a defect (e.g. fault 36), the power module must be replaced.

See www.partdetective.de
(optimized for smartphones)
for a replacement/order option for the power module.

The device and user statistics can be displayed using the operator-control unit OCU or engineering tool BCSoft for further diagnostics and troubleshooting. The user statistics can be reset using engineering tool BCSoft.

Technical Information bulletin for this product

www.docuthek.com
Search term: BCU 580

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