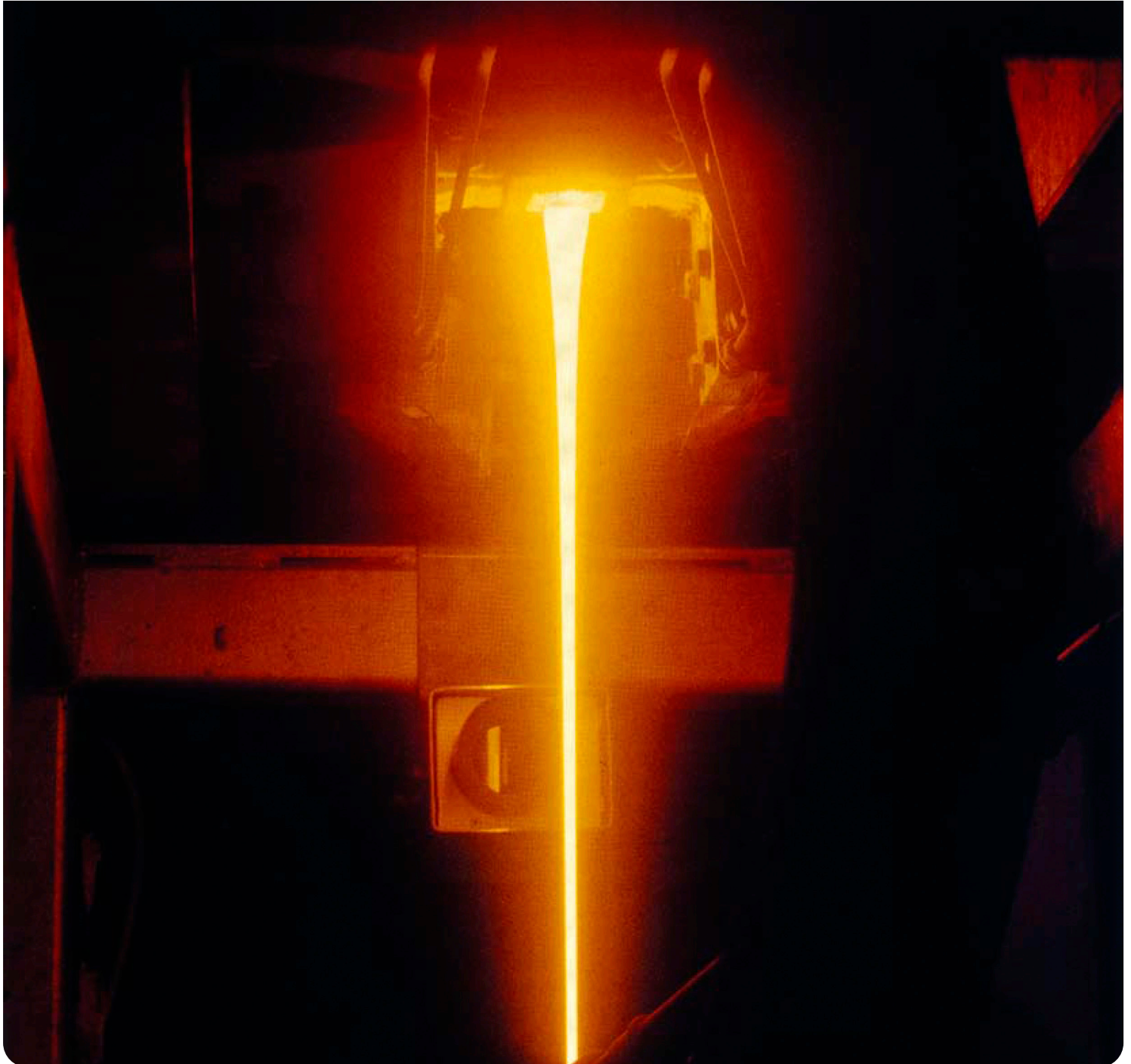


# SEEING IS KNOWING

Automatic measurement of the glass flow from bushing to fiberizer



**GEDEVELOP**  
by PENTRONIC

## ENHANCE PRODUCTIVITY, PROFIT AND QUALITY

- The Gedvelop glass flow meter is a non-contact, optical measurement system that measures the flow of the molten glass that falls from the bushing into the fiberizer.
- The glass flow meter enhances productivity by a continuous measurement of the glass flow individually for each fiberizing unit.
- Many installations worldwide have shown that the glass flow measurement is a very profitable investment with a short payback time.

### GFM GIVES PRODUCT DENSITY REDUCTION

The production is tuned to minimum excess margins reducing the average density by 2 – 4 %.

### INCREASED SPINNER LIFE

Less variation of the glass flow leads to stable fiberizer conditions and the absence of manual pull-checks will increase the spinner life.

### QUICK PULL CHANGE

Depending on the control system it is possible to change pull-rate under full control over the whole operating range very quickly.

### INCREASED PRODUCTIVITY

Less workload on fiberizer zone and product control due to reduced pull-checks and density control.

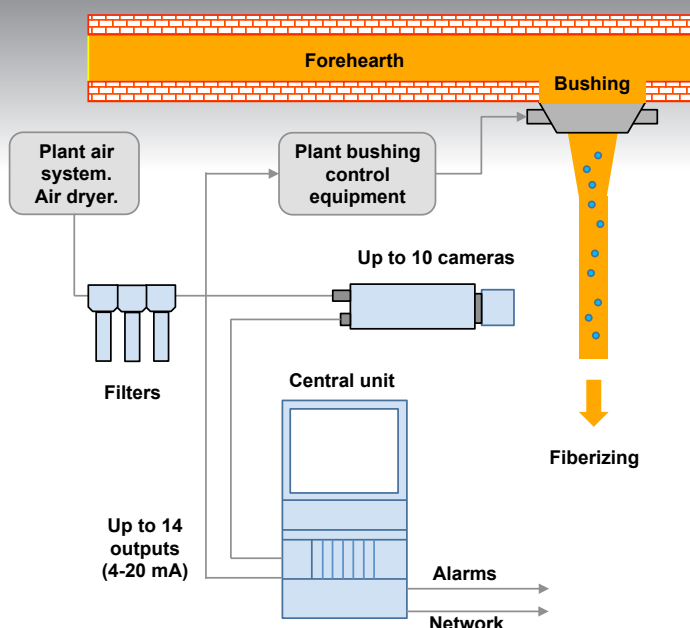
### LESS REJECTS CAUSED BY POOR FIBRE QUALITY

Improved quality due to less fibre variations. Less variation in binder content (%) due to constant fibre flow.

### INCREASED FURNACE AND FOREHEARTH LIFE

Constant pull will stabilize batch melting and forehearth conditions. Early identification of batch problems.

## GFM SYSTEM OVERVIEW



### GFM measuring:

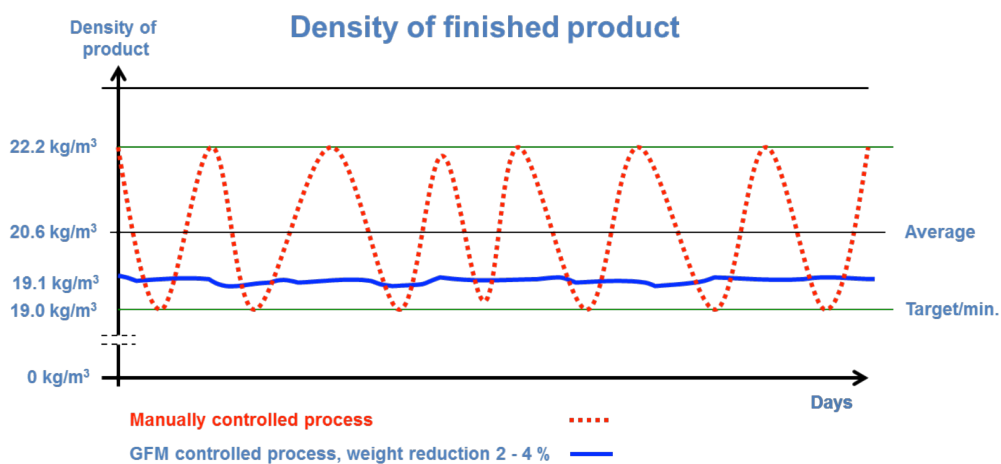
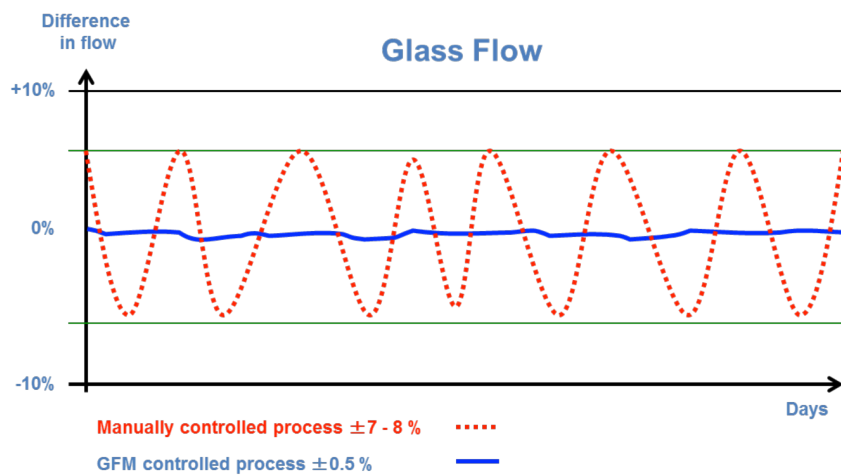
- Diameter of the glass stream
- Speed of the glass
- Central unit calculates the glass flow
- Signal to the bushing control equipment
- Optional temperature measurement

### Overview:

- 1 - 10 cameras
- Central unit
- 14 analogue outputs (4-20mA)
- 32 digital outputs for alarms
- Camera interface module
- Touch screen
- Optical pyrometers (optional)
- Measuring range: 50 - 2000 kg/h (110 - 4400 lbs/h)

## GLASS FLOW AND DENSITY OF FINISHED PRODUCT

Manually controlled process will allow the glass flow to vary within  $\pm 7-8\%$ . Using the GFM control equipment you can keep the glass flow within  $\pm 0.5\%$ . Thus, you can control the density of the finished glass fibre product very smoothly just over the minimum target. This means you will reduce weight of the product by 2 - 4 %. User of the GFM system have found that it pays off in very short time.



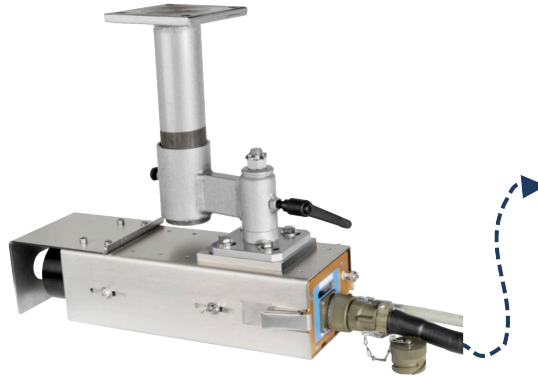
## THE CAMERA

### THE CAMERA

The air-cooled camera is designed to withstand the heat, smoke, moisture and strong magnetic fields that exist in the fiberizer area.

### PNEUMATIC COOLING

The electronics is cooled by a vortex cooler, which also heats the lens system to prevent condensation. The camera is designed to work in an ambient temperature up to 150°C (302°F). The air supplied to the camera is filtered through a set of filters.



### MULTIFUNCTIONAL HOLDER

The camera holder not only keeps the camera in position but also acts as a thermal and mechanical protection. The camera slides into the holder, locks in position, and is aligned towards the glass stream with the help of a row of LED's.

You can view the LED's through a window at the back of the camera.

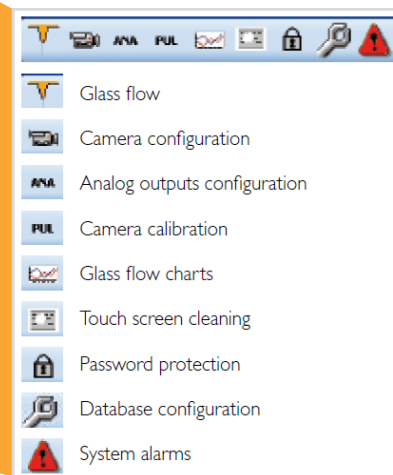
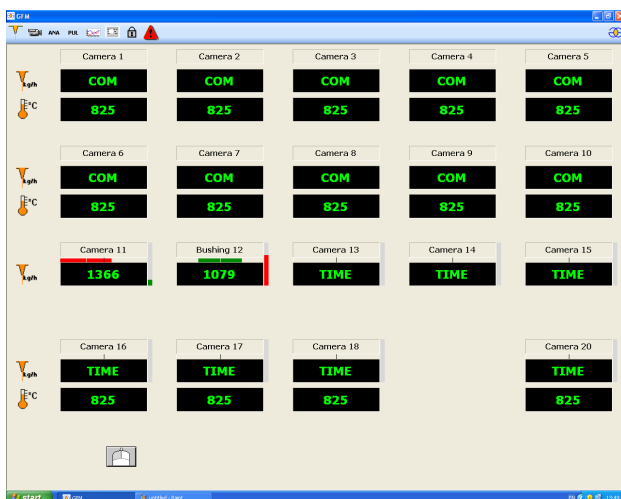
### HEAVY-DUTY CABLING

The prefabricated cable is supplied with heavy duty connectors at both ends for easy connection.

### THE CENTRAL PROCESS UNIT

All user interaction takes place through the Touch screen. Normally, the actual flow and stream temperature (optional) are displayed, or flow charts are shown.

- Analogue outputs – one configurable analogue 4–20 mA output per camera
- Digital outputs – 3 relay outputs for different alarms per camera
- Camera interface module – where the primary processing of signals takes place
- Power supplies – plug-in type with overload protection
- Cabinet – the standard central unit is mounted in a 19" floor cabinet with a swing-out frame and a glass door. Dimensions: 800 x 2100 x 600 mm (31.5 x 82.7 x 23.6")



Operator's different touch screen control tools.



## GFM SYSTEM

When using a GFM system in the manufacturing process of glass wool it is vital to be able to verify the position of the GFM cameras in order to measure and control the process exactly. By introducing the CMM – Camera Maintenance Manager it is easy to verify that the cameras are correctly positioned.

The GFM concept is a reliable system for the measurement and control of the glass flow. Yet problems can arise, wrongly positioned cameras give less accurate readings and control of the glass flow. The reason is often that the camera has come out of position due to work in the bushing area.

CMM –Camera Maintenance Manager comprises hard-ware integrated in the GFM CPU and updated HMI software. The system gives information related to the position of the cameras, both laterally (aiming) and depth wise (focus). It will also detect if the front lens of the camera is dirty. The information is presented graphically through green/red bars on the system's touch screen HMI, see picture.

CMM –Camera Maintenance Manager also gives information about the temperature within the CPU rack and the status of the voltage of the power supplies. This will ensure optimal performance and extend the life time of the equipment.

## CMM

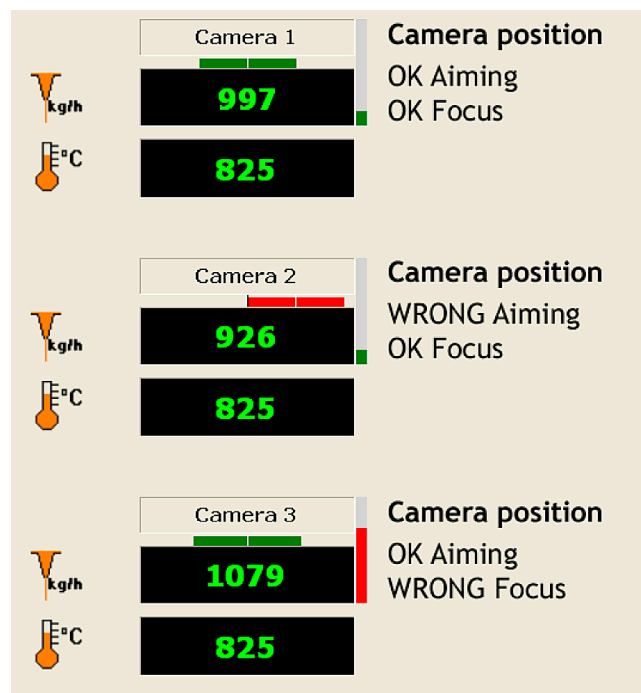
### – Camera Maintenance Manager

With the information about the position of the cameras on the touch screen it is much simpler to verify the exact position of the cameras. This ensures that the measurement of the glass flow is correct.

CMM –Camera Maintenance Manager is a standard part of the GFM system upgrade kit. For users who have already upgraded their GFM system, the CMM is also available as a retrofit kit. The CMM requires the camera motherboard to be all surface mounted.

#### OPERATOR'S INTERFACE

- Glass Flow in lbs, kg or tonnes/day
- Glass Flow charts (trends 24 hours at a time)
- Pull check / Camera calibration
- Camera configuration
- Analogue outputs configuration
- Database configuration
- Glass stream temperature (if pyrometer installed)



## PYROMETER UPGRADE FOR THE GFM SYSTEM

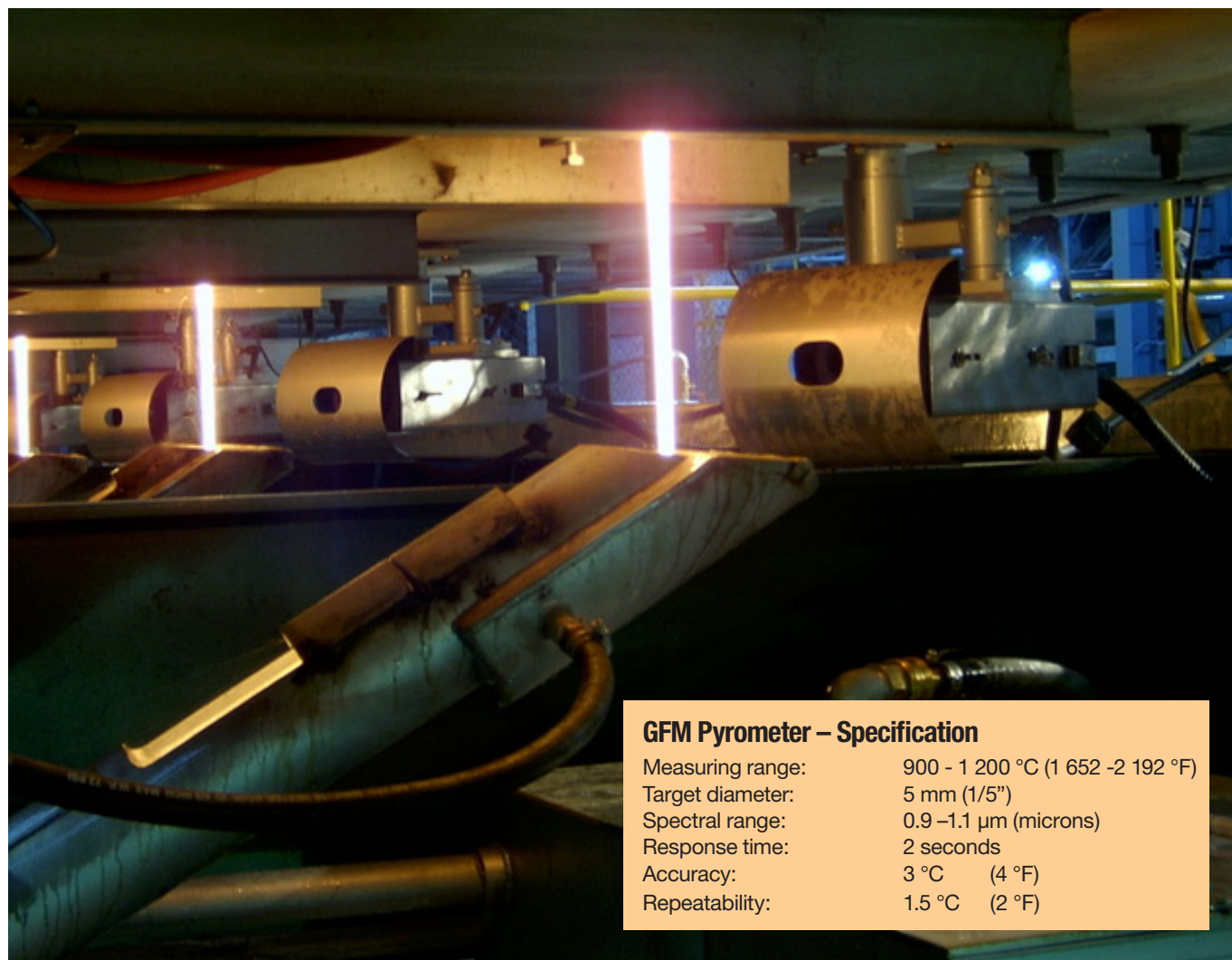
Measuring the temperature of the glass stream in the glass wool manufacturing process will increase the understanding of the fiberizing process and improve the potential and accuracy in controlling it. It will give the possibility to improve the glass properties and fibre forming.

The updated pyrometer has an entire all digital design and adjusts automatically to the glass emissivity. Intensity fluctuations caused by the varying size and shape of the glass stream or the presence of dust, smoke or gas along the optical path of the pyrometer is eliminated by the ratio detecting principle.

The two-colour ratio pyrometer consists of a module mounted inside the GFM camera. The temperature measurement is displayed on the CPU touch screen - HMI.

The temperature of the glass stream is measured at the same time as the glass flow is measured by the GFM system, and in the same position all the time.

The pyrometer is an option when ordering a new GFM camera, but can be retrofitted in existing cameras. In this case, the camera should be returned to Gedvelop for installation and calibration.



*GFM Glass Flow Meters controlling glass fibre insulation production.*



## UPGRADE KIT FOR GFM - GLASS FLOW METER

The GFM system has been on the market for more than twenty years. The concept is a success and it is implemented in most glass wool manufacturing plants around the world. Over the years the system is undergoing continuous development to adopt it to the latest technology and to demands.

The GFM system with hand held terminal and printer is today an overdue version. Even though it still performs well in many plants, time passes and the former type should be replaced. A number of components used in this version, are no longer in production and are hard to find on the replacement market. As a result it is difficult to get this version repaired if needed.

To minimise the risk for interruption in production it is recommended to upgrade the former GFM version to the latest standard.

The upgrade kit will not only upgrade the former GFM system to latest standard and secure the support/measurement from the GFM; it will as well improve the performance of the system and add new functions.

The upgrade will be made by changing the CPU rack and equip it with updated computer boards. The display and printer panel will be exchanged to a 19" touch screen panel.

Each camera will be equipped with updated mother and array boards. All other existing parts of the GFM system can be kept intact and used as earlier.

### UPGRADE CAMERA:

- New array board
- New circuit mother board
- + Increased sensitivity reading the glass (bubbles etc.)
- + Increased resistance against moist, humidity

### UPGRADE CONTROL UNIT:

- New computer and computer circuit boards
- New circuit boards for speed and  $\phi$  measurement
- New circuit board for analogue out-put
- New touch screen and communication interface



## WHO ARE WE?

### STATE-OF-THE-ART SOLUTIONS AND TECHNOLOGY

Gedvelop AB was established in 1986. The company is the world market leader in non-contact measurement systems for hot flowing

glass and is the leading partner for all the major manufacturers of glass wool. Since 2014 Gedvelop is a brand of Pentronic AB.

## WHAT IS PENTRONIC?

### PENTRONIC – LEADING TEMPERATURE SENSOR MANUFACTURER IN NORTHERN EUROPE

Pentronic started in the mid-sixties. The main products are temperature sensors like thermocouples and RTDs (Pt100). Imported products like non-contact measuring IR pyrometers completes the programme of temperature measurement products and systems.

Drying processes often need both measuring temperature and moisture. Therefore Pentronic offers what today is known as NIR non-contact moisture measuring equipment.

### INDUTRADE GROUP

Indutrade AB is the owner of Pentronic and more than 200 small and middle-sized companies is registered in the OMX Nordic Exchange Stockholm. For further information see [www.indutrade.se](http://www.indutrade.se)

### PENTRONIC'S PRODUCTS AND SERVICES

- |   |  |
|---|--|
| <input type="checkbox"/> Temperature sensors      | <input type="checkbox"/> Temperature calibration equipment |
| <input type="checkbox"/> Connectors and cables    | <input type="checkbox"/> Temperature calibration services  |
| <input type="checkbox"/> Temperature transmitters | <input type="checkbox"/> Training courses in temperature   |
| <input type="checkbox"/> IR-pyrometers            | <input type="checkbox"/> Moisture and thickness monitors   |
| <input type="checkbox"/> Temperature indicators   | <input type="checkbox"/> Flowmeters                        |
| <input type="checkbox"/> Temperature controllers  | <input type="checkbox"/> GFM Glass flow meters             |
| <input type="checkbox"/> Dataloggers              |  |



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