

GMS™

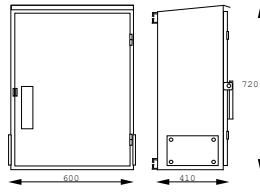
State of the art Monitoring Station



The General Monitoring Station is an advanced communications platform for weather stations, camera systems, traffic monitoring, road / runway status monitoring or variable message signs control. The GMS can also be embedded in the end users systems.



Cabinets



GMS™ computer cabinet

Material	Stainless steel SS 2333
Cerificates	EN 50081, EN 50082
Weight	20 kg (approx)
Filters	Incoming power and signals
Power input	30V AC
Protection	Fault current protection 30 mA on 230V user power output
Order number	FFVGSB-6216

µ-GMS™ computer card cabinet

Material	Aluminum
Dimensions height × width × depth	250 mm × 170 mm × 110 mm
Power input	24V AC or 24 V DC
Cable connection	18 pin
Sensor connection	4 holes
Misc	Room for up to 4 signal converters
Order number	FFVGSB-6820

µ-GMS™ connection box

Material	Aluminum
Dimensions height × width × depth	250 mm × 170 mm × 110 mm
Power input	230V AC 6A (other source upon request)
Power output	24V AC, 24V DC and 12V DC
Filters	230V Voltage peak and interference, Telephone signal, incoming cables. EN 50081, EN 50082
Connections	10 holes for sensor cables and power inlet
Misc	Room for modem, Signal converters etc.
Order number	FFVGSB-6830

Computer cards

Computer card hardware, GMS™ and µ-GMS™

Type	Amount/Size/Type	Specification
MCU	1	Motorola 68332, 16 MHz up to 25 MHz on request
ROM	8.5 MB (µ-MS) 4.5 MB (GMS)	Flash-ROM 4-8 MB ROM 0,5 MB
RAM	4 MB (µ-GMS) 2MB (GMS)	
RTC	1	Real Time Clock
Power	DC Voltage	12V 200 mA (µ-GMS) 5V 500 mA (GMS)

Computer card software, GMS™ and µ-GMS™

Real time, multiprocess operating system	RTXC
Watchdog	Supervises all processes functionality. Automatically reboots system if error detected
Remote update	Software can be remote updated
Object oriented design	Enables a structured construction of the system
File transfer	ASCII, Xmodem and Ymodem transfers
Optional logging	Stores information in Flash-ROM at specified intervals

IO connections, GMS™ and µ-GMS™

Type	Number of channels	Specification
RS232	4 (µ-GMS) 8 (GMS)	Max 460 800 bps
Analogue input	8 (µ-GMS) 16 (GMS)	4-20 mA.
Digital input	16 (µ-GMS) 15 (GMS)	12V
Digital output	8	12V
High performance counters (TPU)	6	Frequency up to 219 Hz, Pulse width, period time etc.

IO configuration, GMS™ and μ-GMS™

Type	Channel number	Configuration
RS232	1	System communication channel. Software support for modem communication, ordinary or GSM (Siemens M20, TC35, Ericsson)
RS232	2	System communication channel. Direct RS232 connection
Analogue	1	Air temperature sensor
Analogue	2	Air humidity sensor
Analogue	3	Pressure
Digital input	1-6	Wind direction sensor
Digital input	7-9	OpticEye precipitation sensor status (internally connected).
Counter	1	Wind speed sensor (WAA151)
Counter	2	OpticEye precipitation sensor

Ordering number

GMS FFVGH5-6070, -6080, -6090

μ-GMS FFVGH5-6800, -6810

Standard weather station sensors

OpticEye™ standalone precipitation sensor



Material	Aluminum
Dimensions height × width × depth	530 x 330 x 330 mm (μ-GMS)
Weight	Approximately 3 kg

Power need	24V AC/DC (from connector box)
Power consumption	10-25 W (depends on environment temperature)
Input data	Air temp, humidity, wind speed (internally retrieved from computer card)
Output data	Classification in rain, snow, sleet, snow drift Intensity for rain in mm/h <± 10%. Intensity for snow in mm/h snow depth <- 30% Intensity for other types are in mm/h <±50%
Heating	Yes
Resolution	0.1 mm/h
Order number	FFVGH5-5031

Also available in version integrated with GMS, FFVGH5-5035

Wind sensors



	Anemometer	Wind vane
Measurement range	0.5 ... 60 m/s	0 ... 360 °
Performance (accuracy)	+ 0.3 m/s (< 10 m/s) < 2 % (> 10 m/s)	< ± 3°
Threshold	< 1.0 m/s	< 1.0 m/s
Distance constant	2 m	
Delay distance		0.6
Operating temperature range	0 ... +55 °C	0 ... +55 °C
Dimensions (height x width)	265 × 360 mm	
Weight	360 g	
Heating	No	
Order number	FFVGH5-6710	

Anemometer

Measurement range	0.4 ... 75 m/s
Performance (accuracy)	+ 0.17 m/s
Threshold	< 0.5 m/s
Distance constant	2 m

Delay distance	
Operating temperature range	-40 ... +55 °C
Dimensions (height x width)	240 × 90 mm
Weight	570 g
Heating	Yes
Order number	FFVGSH-5004

Wind vane

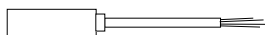
Measurement range	0 ... 360 °
Performance (accuracy)	< ± 3°
Threshold	< 0.4 m/s
Distance constant	
Delay distance	0.4 m
Operating temperature range	-40 ... +55 °C
Dimensions (height x width)	300 × 360 mm
Weight	660 g
Heating	Yes
Order number	FFVGSH-5005

Air Temperature and Humidity sensor



Parameter	Temperature	Relative Humidity
Range	-50 - +50 °C	0 ... 100 %
Performance (accuracy)	< ± 0.3 °C	± 2 %, 0 ... 90 % ± 3 %, 90 ... 100 %
Order number	FFVGSH-6256	

Surface temperature sensor



Type	Pt100 43760 class A with 20m cable
Range	-50 - +50 °C (Other ranges upon request)
Performance (accuracy)	< ± 0.3 °C
Order number	FFVGSH-5003

Air pressure sensor



Range Performance (accuracy)	0.07 ... 4000 bar (Other ranges upon request) ± 0.1% r
Order number	FFVGSH-6700

Additional sensors and equipment

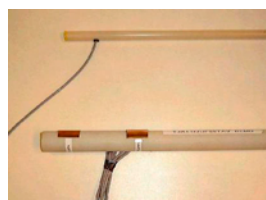
Color and NIR camera



Parameter	Color	IR
Resolution	640x480	640x480
Picture format	JPEG	JPEG
Compression	10%-90%	10%-90%
Daylight filter	No	Yes
Order number	FFVGSH-6400	FFVGSH-6410

Available in version integrated with GMS

Frod™ Ground frost sensor



Type	Electronic, microprocessor controlled
Sensor depth difference	50 mm (other differences upon request)
Sensor depth coverage	0 ... up to 3 m (ranges set upon request)
Performance (accuracy)	< ± 0.3°C
Order number	FFVGSH-6600

Frensor MkII™ Freezing point sensor



Type	Active, uses peltier element to detect phase shift from liquid to solid state of deicing fluid. Independent of deicing chemical used
Freezing point detection range	-20 ... 0 °C (Accuracy – 0.2 °C)
Operating temperature	-50 ...+50 °C. (Freezing point data in the interval -40 ... +20 °C)
Miscellaneous	A system consists of one controller card and up to four sensor heads. Factory calibrated.
Order number	FFVGSH-7650

Visibility sensor



Type	Forward scattering, 2 W at 880 nm for 100-µs per sample
Power	12 V DC, 10mA
Size and weight	Approximately 250 x 110 x 150 mm, approximately 2 kg
Operating temperature	-40 ...+40 °C.
Measurement range	0 ... 640 m
Miscellaneous	RS232 interface to computer card
Order number	FFVGSH-6067

Net Radiometer

(requires GMS™ stainless steel cabinet)



The CNR 1 Net Radiometer is intended for research level total global net radiation measurement; the energy balance between the incoming spectral short-wave and long-wave IR radiation, from 0.3 to 50 mm, relative to the surface reflected short-wave and outgoing long-wave IR radiation. The integrated four-way sensor design of the CNR 1 incorporates an upward-facing, ISO-class thermopile pyranometer and pyrgeometer, and a complimentary pair downward-facing pyranometer and pyrgeometer. The body of the CNR 1 houses a PT-100 RTD temperature sensor (YSI 10K thermistor optional), for accurate instrument body temperature measurements. Upon manufacture, the sensitivity of all four sensors are trimmed and calibrated to a single identical sensitivity coefficient.

Order number FFVGSH-6720

Heat flux plate



CN3 Heat Flux Plate

The Middleton CN3 Heat Flux Plate senses the conductive heat transmission in the medium in which it is buried. It is suitable for soil energy balance studies and for determining heat transfer in walls roads and bridges.

Order number FFVGSH-6730

Traffic Monitoring System (TMS)

Real time traffic counter. Specification can be obtained upon request. Integrated in GMS.

Order number FFVGSH-6900

3D Wind sensor



Short pulses of ultrasonic sound are exchanged on three different directions by couples of sound probes which are used alternately as transmitting and receiving units. The sound probes are mounted in aerodynamical shaped housings providing a significant reduction of flow distortion. The sound velocity derived by traveling time of the ultrasonic pulses is composed of the sound propagation of the motionless air itself, i. e. the wind speed parallel to the trajectories of the ultrasonic pulses. Combining the sound velocities of different propagation directions, the 3-dimensional wind vector can be determined. Furthermore, the sound velocity in a motionless atmosphere is derived which corresponds to a measurement of the virtual temperature.
Order number FFVGSB-7800

Ice buildup sensor FFVGSB-7670



Monitors ice buildup according to the ISO 12494 std. The sensor is heated and rotates in order to get correct readings in adverse weather conditions. Specification can be obtained upon request. Integrated in GMS.
Order number FFVGSB-7670

Variable speed limits/Variable Message Signs (VMS)

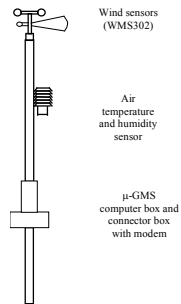


Handling of variable message signs is prepared in GMS and μ -GMS systems. Integration of specific end user VMS are performed upon request. Common VMS types are text and fully graphical ones.

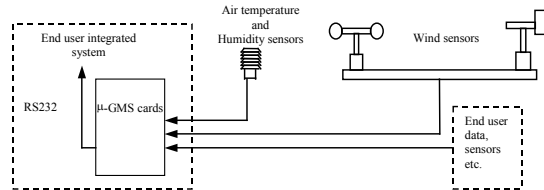


Integration examples

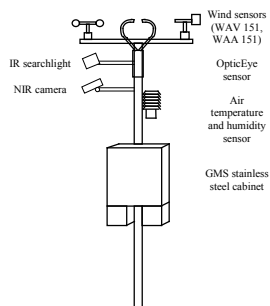
μ-GMS™ weather station (Low cost and high quality)



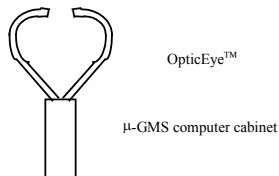
μ-GMS™ computer card integrated into end user system



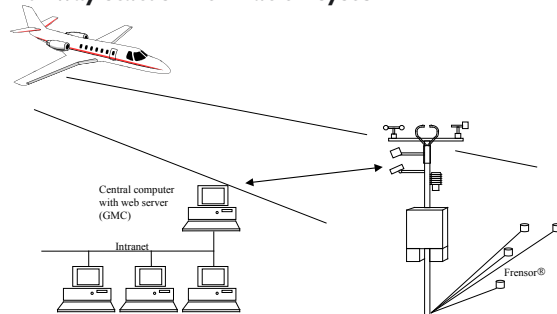
GMS™ weather station



OpticEye™ standalone



Runway status information system



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ITS by SAAB

ITS (Intelligent Traffic Systems and Services) is all about IT-applications in the transport world. ITS plays an important role to improve traffic efficiency and safety. We can offer a variety of products and services covering most aspects of ITS. We have customers both domestically and abroad. Combitech has more than 25 years experience of ITS consultancy and systems integration in a variety of applications in many countries.

Saab is one of the world's leading high-technology companies, with its main operations in defence, aviation, space and civil security. Saab covers a broad spectrum of competencies and capabilities in systems integration.

Saab develops, manufactures and delivers advanced products and services for the defence market, as well as for commercial markets where its expertise creates business opportunities.

Thanks to its strengths and strategic partnerships, Saab has the world as its market, but research, development and production are carried out principally in Sweden. Saab has a total of 12,800 employees. Total annual sales are SEK 19,314 million. Research and development corresponds to about 20 percent of turnover.

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