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R. FUESS

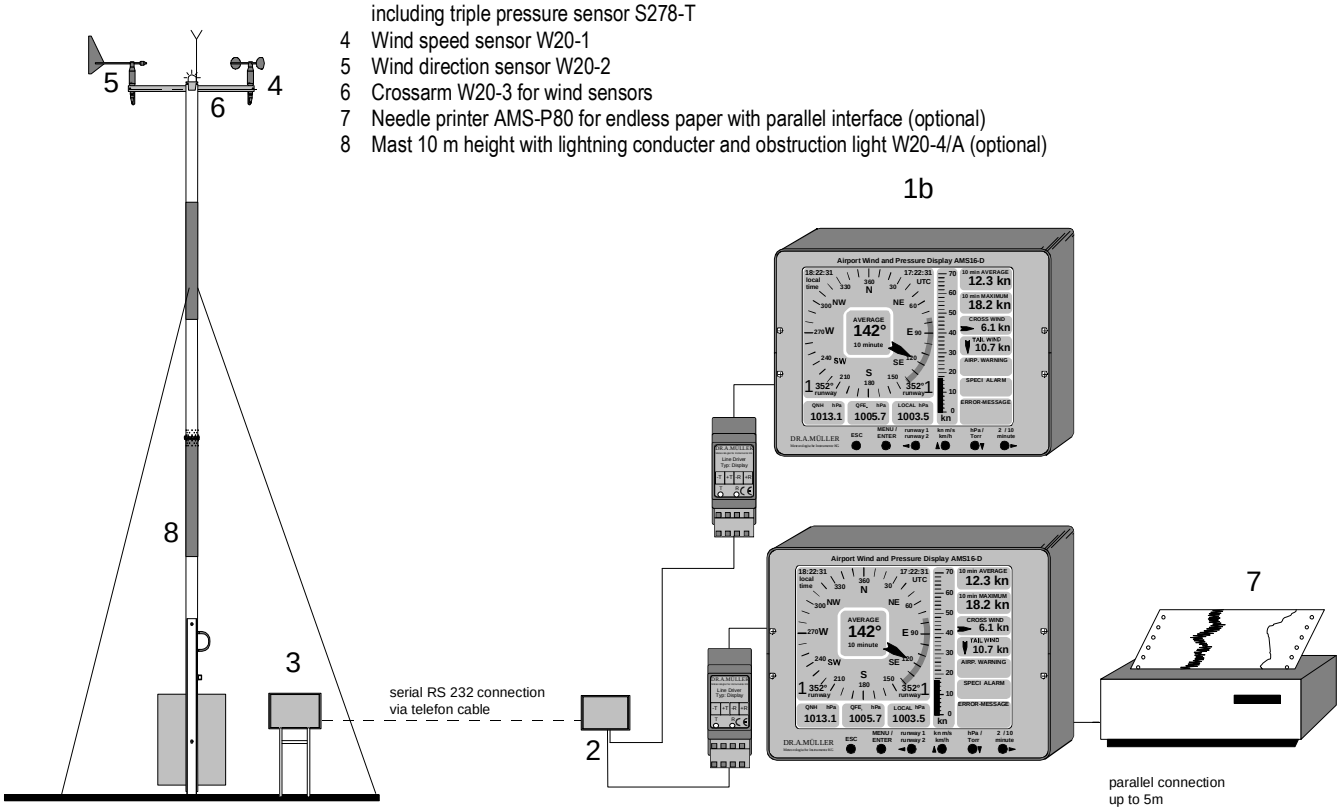
Airport

Wind and Pressure

Monitoring System

AMS 16 – WP

1a Wind Display AMS16-D accordingly to the ICAO standards
1b Second Display AMS16-D (optional)
2 Display Connecting Box AMS16-CB
3 Outstation with sensor interface AST16-2
including triple pressure sensor S278-T
4 Wind speed sensor W20-1
5 Wind direction sensor W20-2
6 Crossarm W20-3 for wind sensors
7 Needle printer AMS-P80 for endless paper with parallel interface (optional)
8 Mast 10 m height with lightning conducter and obstruction light W20-4/A (optional)



Airport Wind and Pressure Monitoring System AMS16 - WP

The AMS16 System is designed, to perform wind and pressure measuring on international, domestic and military airports in compliance with WMO standard No. 49 and the ICAO rules. Its main merits are: Big and rugged wind sensors, big and clear arranged display unit, digital data transmission by telephone cable or radio modem.
A typical wind and pressure measuring system will consist of the following components:

1.	Wind Display	AMS16-D
2.	Display Connecting Box	AMS16-CB
3.	Outstation with sensor interface	AST16-2
	including triple pressure sensor	S278-T
4.	Wind speed sensor	W20-1
5.	Wind direction sensor	W20-2
6.	Crossarm for wind sensors	W20-3

Optional:

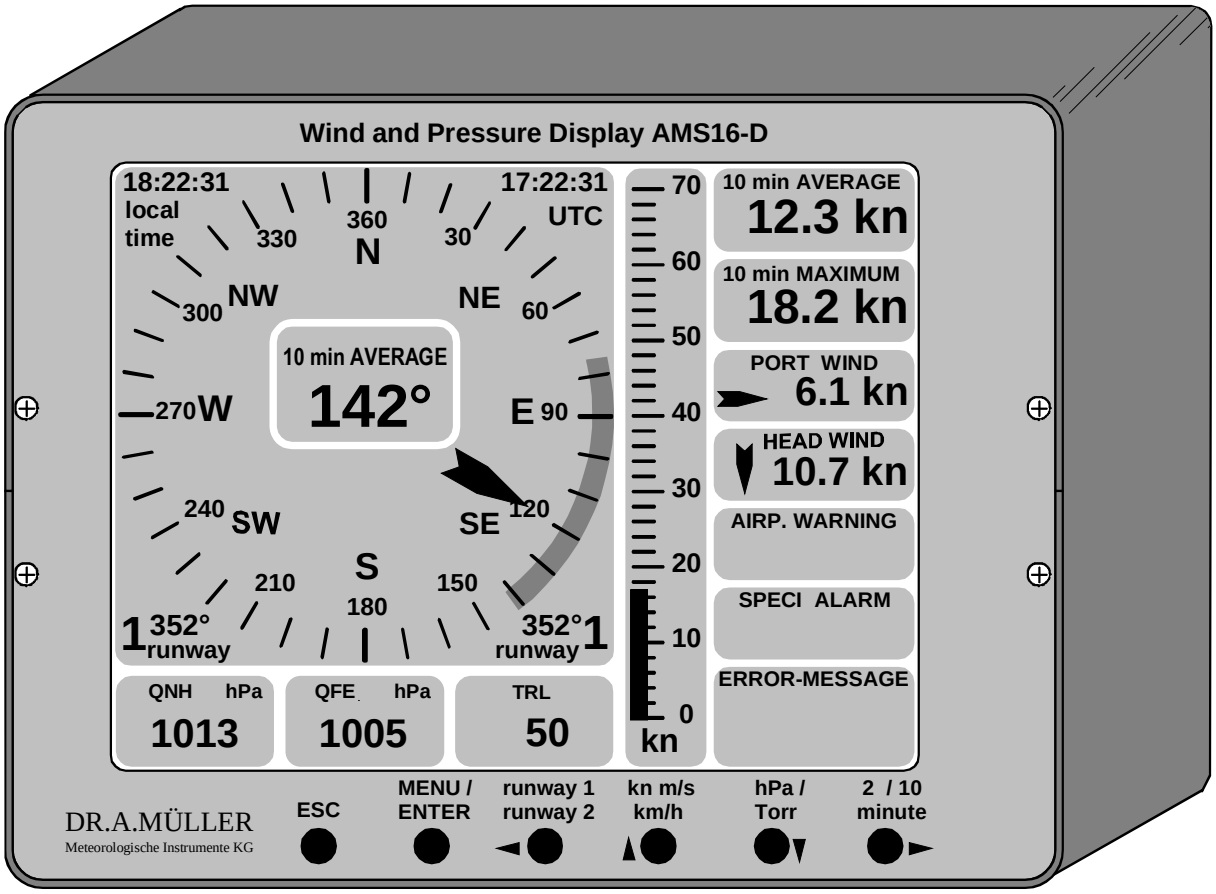
7.	Needle printer for endless paper with parallel interface	AMS-P80
8.	Mast, 10 m height, for wind sensors with span ropes, lightning protection, ostruction light at the top of the mast, security painted in red and white	W20-4/A
9.	Telephone underground cable for data transmission	AMS16-TC1
10a.	Pair of Radiomodems for long distance transmission	AMS16-RM2
10b	Pair of Yagi-directional antenna for use of radiomodems	YAA2-2C
11.	Windsensor-Heating: Order-no.	W20-1/H and W20-2/H

1. Wind and Pressure Display AMS16-D

The airport wind and pressure display AMS16-D, distinguished by its compact design and clear display, based on a PC compatible embedded processor board (PC/104) and a 10 inch TFT colour display with 640 x 480 pixels, CFL background illuminated. The display shows wind values according to the ICAO rules and WMO standard No. 49 and has the ability to show additional values for QNH (air pressure on sea level) QFE (air pressure on runway level) and TRL (transition level), if a pressure sensor is installed in the outstation.

In the window ‘AIRP. WARNING’ there will be given the following information in case of occurrence: Wind speed sensor defective, wind direction sensor defective, 10 minute average of wind speed above 20 knots, gust above 30 knots.
In the window “SPECI ALARM” there will be given the following additional information: Variation of wind direction more then 60° during the last 10 minutes, change of the 10 min. average of wind speed more then 10 knots during the last 10 minutes, gust increased more then 10 knots during the last 10 minutes.
In the window “ERROR MESSAGE” there will be given errors detected by the system as there are: Communication trouble, sensor trouble more precisely then in the field “AIRP. WARNING” and display trouble.

The warning-, alarm- and error-message will remain on the display till it will be set back by the menu point “conformation”. The display AMS16-D receives its data by RS232 interface, depending of the method of data transmission. The wind values can be plotted as diagram on a printer by a parallel printer port with different paper speeds.



Specifications:

Displayed values:

Wind speed	digital display of 2 minute or 10 minute average digital display of 10 minute maximum respectively Gust digital display of cross wind (speed component crosswise to runway) digital display of tail wind (speed component in direction of runway bar graph for Instant. values 0...35 m/s or 0…70 kt or 0…140 km/h
Wind direction	arrow on compass rose 1...360° digital 2 or 10 minute average respectively variation
Air pressure	QNH (reduced to sea level) QFE (reduced to runway level) TRL (Transition level)
Airport warning	trouble of speed sensor trouble of direction sensor 10 min average value of wind speed > 20 knots gust > 30 knots

Speci alarm	variation of wind direction more then 60° during the last 10 min 10 minute average of wind speed changes more then 10 knots gust increases more then 10 knots VRB <> ASD

Push bottoms:

Menu	to enter into the menu
Arrow left	to jump inside of the menu and to select the outstation
Arrow up	to scroll inside of the menu and to select the dimension of wind speed
Arrow down	to scroll inside of the menu and to select the dimension of air pressure
Arrow right	to jump inside of the menu and to alter between 2 and 10 min average

Interfaces:

RS232	for communication between outstation and display via modem
Keyboard	DIN connector for keyboard for purpose of installation

Power supply	:	100...230 V AC 50/60 Hz
Operating temperature	:	0 ...60°C
Storing temperature	:	-40...85 °C
Moisture	:	0...95 % at 50°C , non-condensing
Dimension	:	280mm x 225mm x 100mm (WxHxL)
Weight	:	3 kg

2. Display Connecting Box AMS16-CB

The display connecting box with a robust plastic enclosure (IP 65) for wall mounting contains the clamps for power input, the clamps to connect the data transmission cable coming from the outstation and the clamps to connect the cable to the AMS16 Display. It is also prepared to accommodate a telephone modem or a radio modem and its power supply.

Specifications:

Signal input	:	Clamps for cable from outstation
Signal output	:	Clamps for cable to the displays
Power supply	:	100…240 V AC , 0.1A
Options		
Radio modem	:	installation prepared
Telephone modem	:	installation prepared
Ambient temperature	:	- 20...60°C
Storage temperature	:	-40...85°C
Ambient Humidity	:	0...100% at 50°C
Dimension	:	300mm x 300mm x 180mm

3. Outstation AST16-2

The outstation with a robust and water tight enclosure (IP 65) contains the power supply, the clamps for power input, for sensor connection and for the signal cable and a micro controller unit. This converts the analogous values of the wind- and pressure sensors into serial messages and gives them out by a RS232 interface. The outstation is also prepared to enclose a radio modem or a telephone modem, to convey the data over a far distance more then 2.000 meters by cable or radiosignal.

Specifications:

Analog inputs for	:	wind direction sensor W20-2
	:	Air pressure sensor (installed)
Counter input for	:	wind speed sensor W20-1
Interfaces	:	RS232
Baud rate	:	2400 / 19,200 bps
Power supply	:	100…240V AC , 1A
Radio modem option	:	installation prepared
Telefone modem option	:	installation prepared
Ambient temperature	:	- 20...60°C (unheated) -40...60°C (heated)
Storage temperature	:	-40...85°C
Ambient Humidity	:	0...100% at 50°C
Dimension	:	300mm x 300mm x 180mm

4. WIND SPEED SENSOR W20-1

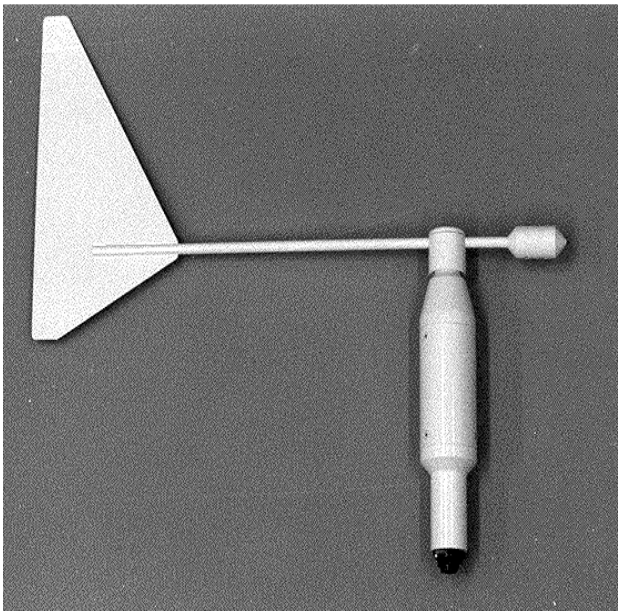
This sensor W20-1 is designed for measuring of wind speed with low threshold (0.5 Kn.) up to strongest wind. The rugged three-cup anemometer shows an excellent accuracy and linearity. It is completely made of anodised aluminium, stainless steel and Delrina durable and lightweight. A labyrinth prevents dust and water from bearings. A water-proof 7-pin plug provides a safety cable connection. Eight small magnets attached to the axis produce in a fixed dry-read contact pulses frequency proportional to wind speed. One rotation of cup assembly causes eight pulses. As a further advantage is the easy replacement of a single cap with arm. The large dimensions of the caps makes the sensor suitable for frosty regions without using of a sensor heating.

Specifications

Sensor type	:	3-cup anemometer with dry-reed contact
Signal output	:	8 pulses per revolution 3.22 m per revolution 0.402 m/s / Hz 0.7813 knots / Hz
Measuring range	:	0 - 80 m/s
Threshold Point	:	0.3 m/s
Accuracy	:	1.5 % of measured value
Ambient Temperature	:	-20 ... + 60°C
with heating	:	-50 ... + 60°C
Ambient Humidity	:	0...100%
Cup diameter	:	100 mm
Cup wheel diameter	:	410 mm
Dimension (body only)	:	300 mm x 60 mm (HxD)
Weight	:	1.5 kg
Material	:	aluminium (anodised), stainless steel and delrina
Order-no. for sensor with heating	:	W20-1/H

5. WIND DIRECTION SENSOR W20-2

This sensor W20-2 is designed for measuring of wind direction with low dumping ratio and low overshoot up to strongest wind. The rugged wind vane shows an excellent accuracy and linearity. It is completely made of anodised aluminium, stainless steel and Delrina durable and lightweight. A labyrinth prevents dust and water from bearings. A water-proof 7-pin plug provides a safety cable connection. A high precision potentiometer with only a gap of 2 degree in the north position transforms the turning of the vane into an electrical signal. As a farther advantage the easy replacement of the vane with its arm is to mention. The large dimensions of the vane make the sensor suitable for frosty regions without using of a sensor heating.



Specifications

Sensor Type	:	Wind vane with ring potentiometer
Measuring Range	:	1 ... 359°
Accuracy	:	+/- 2°
Dumping Ratio	:	0.2 m/s
Distance Constant	:	1.5 m
Overshoot	:	lower than 10°
Potentiometer Linearity	:	< 0.3 %
Resistance	:	5 k Ohm (other resistances on request)
Power Supply (sensor)	:	50 V / 10 mA max.
Power Supply (heating)	:	230 V / 1 A
Ambient Temperature	:	-50°C ... +60°C (heated) -20°C ... +60°C (unheated)
Ambient Humidity	:	0 ... 100 % RH
Vane Turning Radius	:	430 mm
Body Dimension	:	300 mm x 60 mm (HxD)
Weight	:	1.5 kg
Material	:	anodised aluminium, stainless steel and delrina
Order-no. for sensor with heating	:	W20-2/H

6. Mast W20-4

That strong and rugged mast is placed on a swiveling bearing in the mast base which has to be rooted in a concrete foundation. The standard high is 10 m with 3 stainless steel span ropes. An instrument carrier at the top for 2 wind sensors is standard. Other instrument carriers are optional. To service the wind sensors the mast can be equipped with a counterweight (option /CW) for easy bending down or with climbing steps (option /CS). The whole mast is made from aluminum and the screws are made from stainless steel. The mast base has to be placed into a concrete foundation (1m x 1m x 0.5m) at a depth of 0.5 m.

Preconfigured version for airports: W20-4/A:

Mast 10 m height for wind sensors with span ropes, lightning protection, obstruction light at the top of the mast, security painted in red and white and counterweight for easy handling of bending down

Free configurable options of the aluminum mast: W20-4/…/…

… LP	- lightning protection
…CW	- counterweight for easy handling bending of down
…CS	- climbing steps for entering the mast
…RW	- security painted in red and white
…OL	- obstruction light at the top of mast

Specifications of mast W20-4:

Height	:	10 m (* 6.6 m)
Diameter of the tube	:	120 mm (* 100 mm)
Cross bar at the top	:	for wind sensors W20, length 1.30 m
Rigging	:	by 3 span ropes from stainless steel
Weight	:	ca. 50 kg (*40kg)
Material	:	aluminum
Required foundations	:	concrete socket for mast concrete groundings for span ropes
Optional attachments	:	see above and cross arms for further sensors

*for optional version with 6.60 m height

7. UHF Radio Modem 2ASxE

The 2ASxE is a half-duplex radio modem for transparent transfer of asynchronous data. It complies with the European ETS 300 113 Specification. All the channel spacing (12.5 / 20 or 25 kHz) commonly used are available. The number of selectable channels are 160, 100 or 80, respectively. The maximum data speed is 4800 bit/s at the 12.5 and 20 kHz channel spacing, and 9600 bit/s at the 25 kHz spacing.
The 2AsxE has three modes of operation: the Data transfer mode, the Programming mode and the Test mode. In the Programming mode, the parameters and functions of the radio modem are conveniently set from a computer via the RS-232 interface. The Test mode offers a possibility to test the radio connection through data packet transfer or carrier detection. For farther information see leaflet Satelline-2AsxE.

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