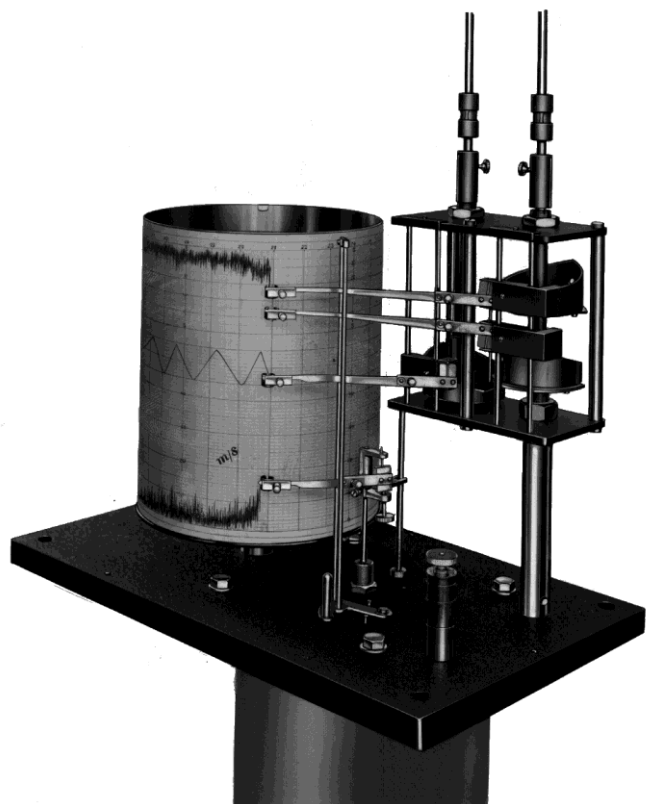
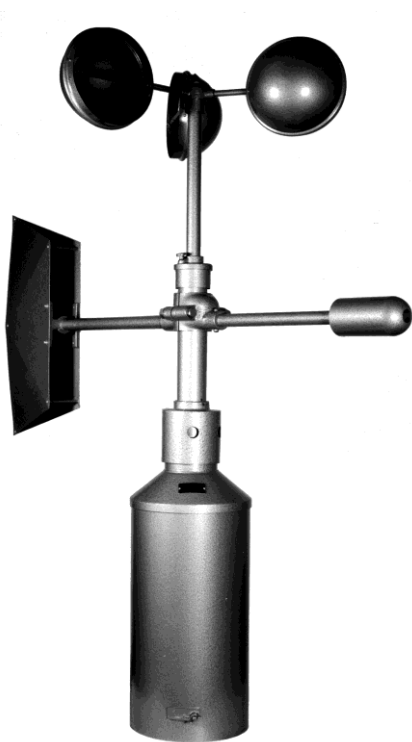
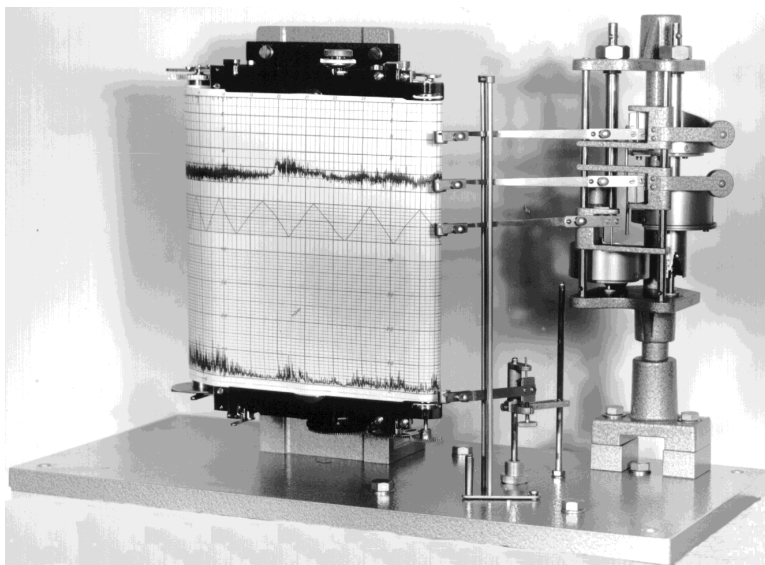


**214,0E**

**ANEMOGRAPH "UNIVERSAL" 82a and 82b**  
**with mechanical and pneumatic transmission**  
**for Recording of Wind direction, Wind run and Gusts**



**82a**



**82b**

Anemographes "Universal" 82a resp. 82b stand out for an especially sensitive recording of wind structure. Wind direction, wind run, and the instantaneous values of wind speed (gusts) will be recorded as continuous curve traces, clear and impressively on a drum or continuous chart. The wind measuring installation consists of the transmitter and the drum recorder resp. continuous chart recorder (cover-photos on page 1).

As wind direction and wind run are mechanically transmitted from transmitter to recorder by transmission rods, the recorder must be vertically mounted underneath the transmitter. Lateral displacement is not permissible. The distance between transmitter and recording instrument may amount to 25 to 30 m, at the most. Most times an installation height of 10 meters is chosen. The transmitter, for instance, is mounted on the roof of a house, and the recorder in a room situated beneath same or, when being installed in the open, in a protective hut (fig. 5).

The transmitter, the base plate of which as per fig. 5 has the shape of a flange, is mounted to a mast, as per fig. 10. Its concentric construction prevents mutual influencing of the measuring elements. Cupwheel and wind vane are of light metal. They are of little weight and have a slight moment of inertia and are running on ball bearings so that they respond, already in the case of low intensities of the wind. The cupwheel starts running at windspeeds below 0.5 m/sec. The wind vane possesses a high degree of adjusting force at nearly aperiodic damping and is free of natural vibration. It is developed as a Pitot tube, to take up dynamic and static pressures. These two pressures are transmitted to the recorder by two dynamic pressure conduits, the rotation of wind vane and cupwheel, by two connecting rods.

All bearing beds are well accessible. The main bearings are running in an oil bath. For occasional lubrication and cleaning of the transmitter, the casing's jacket may be withdrawn in downward direction, after loosening a winged screw that cannot get lost.

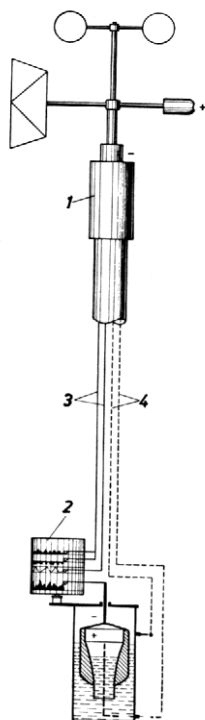
The recorder with drum recording has a drum of 187 mm diameter and 228 mm height. It is driven by a built-in precision anchor-clockwork with a time of rotation of one day. Paperfeed amounts to 22,5 mm per hour. The recording papersheet is fastened by means of a paper clip. For daily changing of the chart, the drum is withdrawn. Period of running of the clockwork is 8 days.

The recorder with continuous chart recording possesses the same height of recording and shape of the curve tracings, as the drum recorder. Recording is effected on a continuous chart of 230 mm width and appr. 18 m length. Paperfeed amounts to 20 mm per hour, period of running of the clockwork is up to 1 month. In the case of continuous operation, a chart roll lasts appr. 34 days.

The recorders are built-in in a metal cabinet with glazed door and are mounted on console angles.

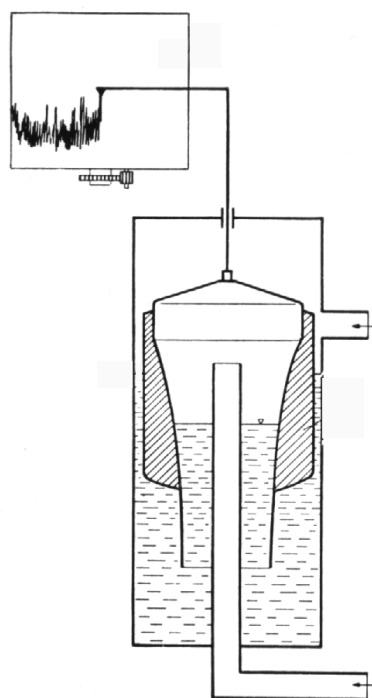
## Measuring Principle

The container with the float for gust recording is arranged underneath the casing of the recorder. As liquid serves water, in frost-endangered rooms an equally heavy frostproof mixture. The delivery piping is connected by means of the supplied rubber hoses in such a way that the joint pressure, coming from the point of the vane is effective underneath, the static pressure, above the float.



**Fig. 1** Wind Measuring Installation

- 1 Transmitter
- 2 Wind Recorder
- 3 Rods
- 4 Pressure Tubing



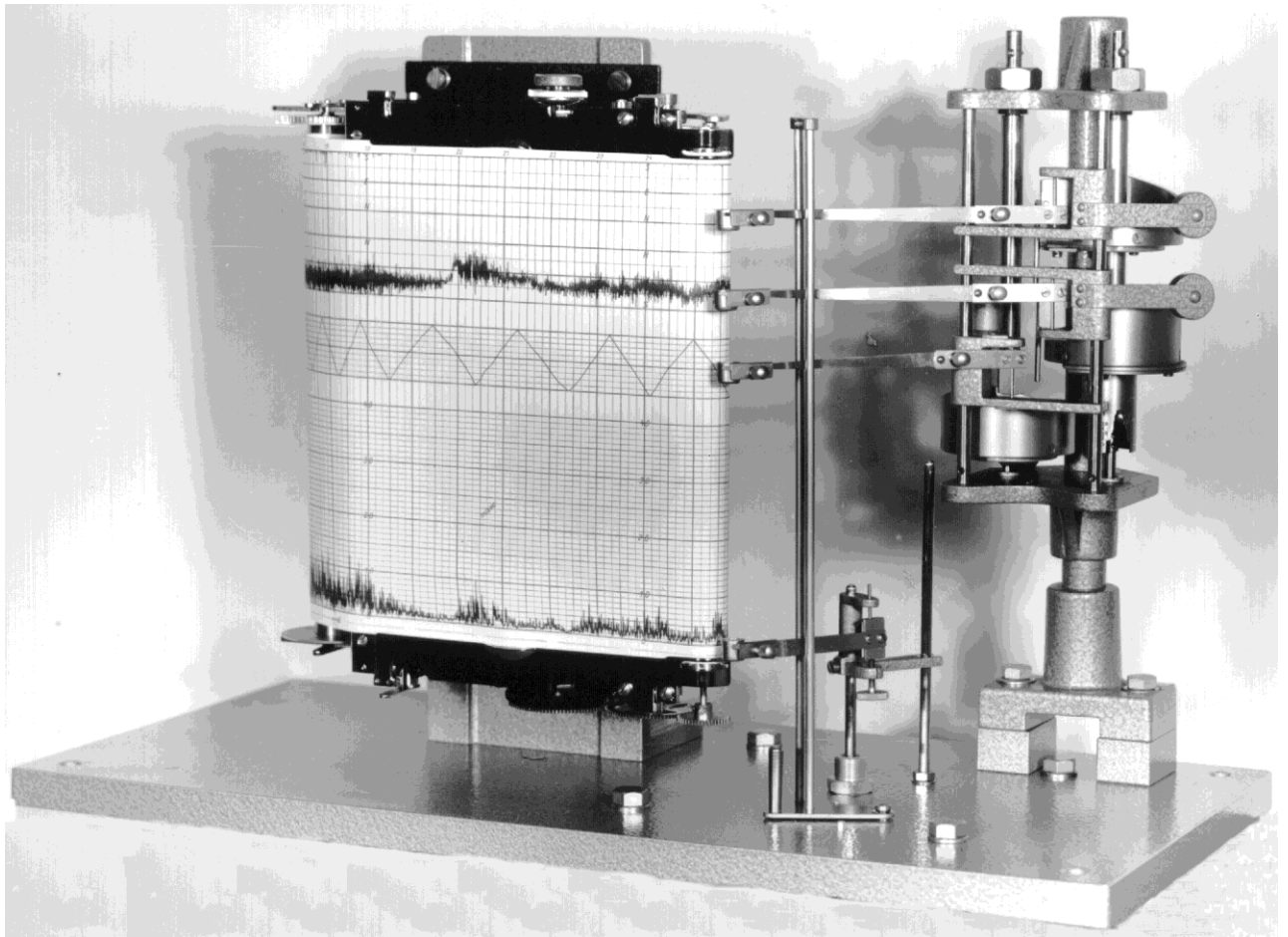
**Fig. 2** Scheme of Gust Recording

By this arrangement one achieves that adjustment of the float, solely, is effected by dynamic pressure. The parabolic shape of the float effects extracting the root from a number so that deflections of the root from dynamic pressure, i.e., of the wind speed, are proportional.

The float - contrary to diaphragm measuring mechanisms - is free from ageing and after-effect phenomena, general construction sturdy and without sensible gearing members. Owing to the pressure tubing's large cross-sections it is achieved that also short time gust peaks are well recorded.

The middle pen records wind run in an alternately rising and falling curve, by traversing the diagram section in changing direction for 10 km wind run, each. This section is divided in ten intervals. One interval corresponds to 1 km of wind run. By counting these wind run intervals, recorded within one hour's time, one obtains the mean speed in km/h resp. the mean wind speed in m/sec by means of a transparent evaluation scale.

The two upper pens, of which each one is coordinated to one half of the compass card, record wind direction in a continuous curve trace.



**Fig. 3** Recorder of Anemograph "Universal" 82b, with continuous chart recording

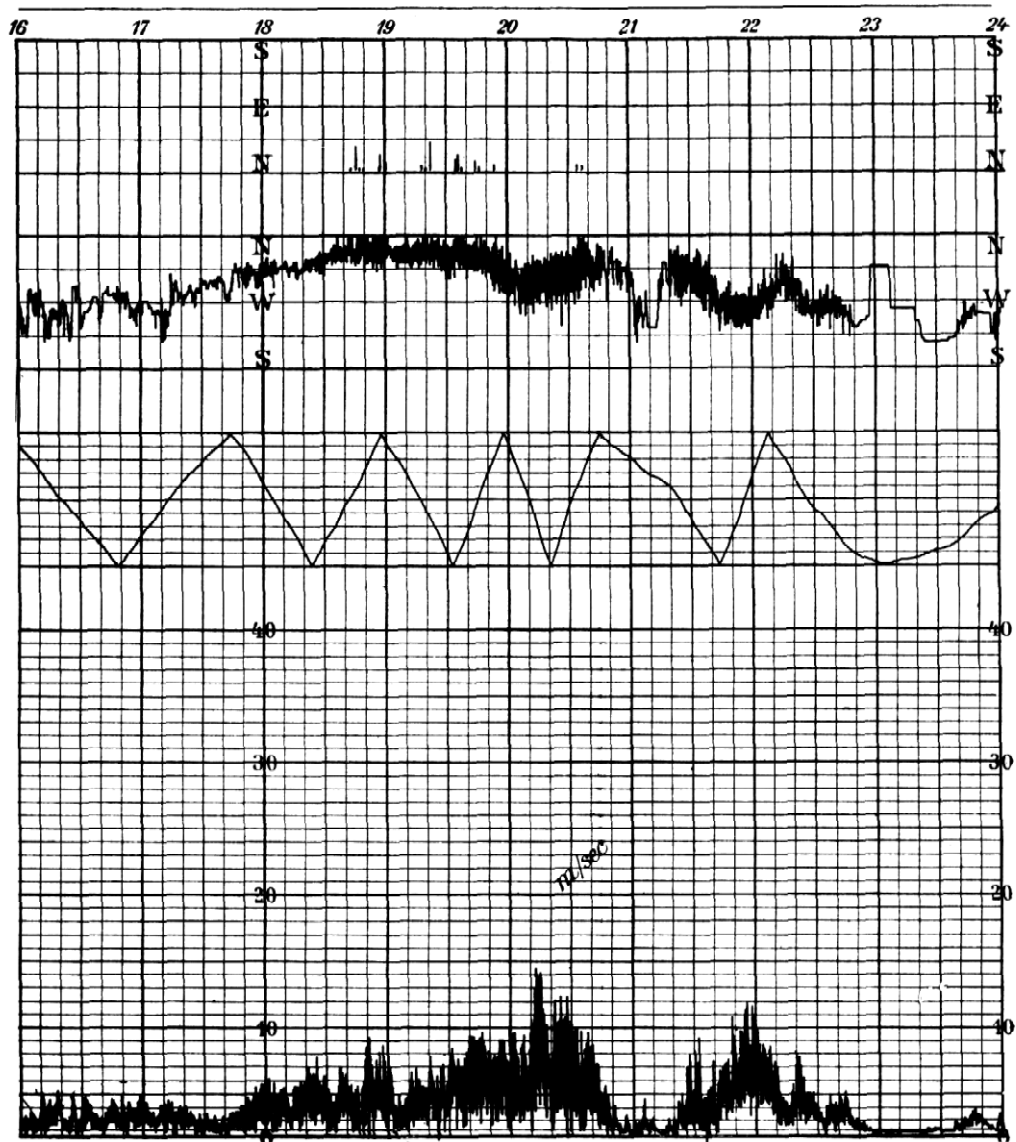
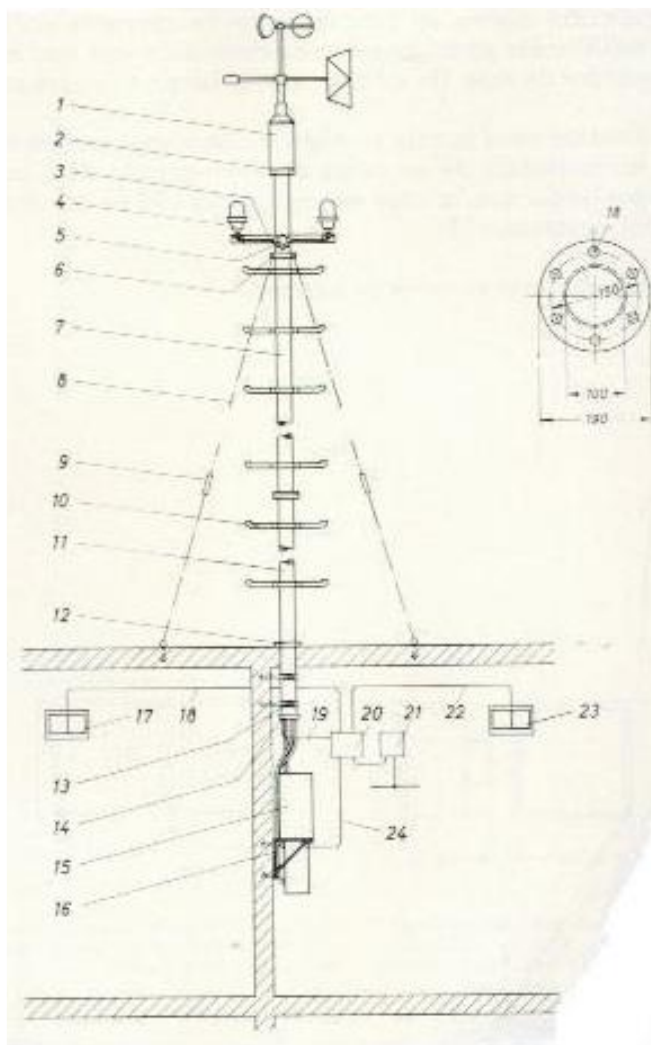


Fig. 4 Reproduction of an original diagram (cut) of Anemograph "Universal" 82a

## Masts of Wind Gauges

In general it is to be recommended to make the mast ascendable, so as to have the transmitter accessible at any time, e.g., during mounting, when effecting adjustment as to the cardinal point, for occasional re-oiling or control or for exchanging the lamps of obstacle lights, in air traffic control. In this case a mast 11 as per fig. 5 is being utilized, fundamental length of which is 6 m. In some cases, a length of 6 m of the mast will not suffice. Then, one or two mast-extensions 7, with two flanges, will be required additionally, which can be supplied in lengths of 2 to 6 m. Correspondingly thereto, transmissions rods and pressure tubes will have to be ordered in adequate length.

Steel-pipe 7, of 100 mm inner diameter and 4 mm wall-thickness, carries above the flange 2 for fitting transmitter 1 (joining measures see fig. 5). Ladder support 3 carries two obstruction-lights 4, in case flight-control requires this. The cable for the lamps is led outside of the pipe to the terminal box 5.



**Fig. 5**

Windmeasuring Installation with pipe mast 82n and Mast-extension 82z

Underneath the ladder-support, there is a clamp for fastening of three bracing wires 8, which are tightened by the turnbuckles 9. The mast-pipe is fastened in direction of the edifice-wall by two clamps 13 and stone-screws at a certain distance, whilst a relieving clamp 12 serves to take up the load total. On demand, climbing-iron 10, at distances of 40 cm.

In order to avoid formation of condensation-water in the mast-pipe, the lower open end of mast-pipe 11 is to be closed by a supplied closing-cap 14, which avoids the mounting of warm room air in the mast and, thus, protects the recorder from running-off condensation-water. Below, the recorder 15 is mounted on two console-angles 16.

Fastening of the mast can be adapted to local conditions. In the case of inquiries and orders we, therefore, request the forwarding of a drawing, from which can be taken the possibilities available and the requirements.

## Specifications

**82a** Anemograph "Universal" with drum recording,  
consisting of:  
Transmitter No. 82aG - with wind vane, Pitot tube and cupwheel (cover-photo)  
height: 1180 mm, weight\*): 19.5 kg  
Drum Recorder No. 82aT - in metal cabinet, with glazed door  
Recording drum: 187 mm diameter x 228 mm height  
rotation of drum: 1 day  
paperfeed: 22.5 mm/h  
period of running of driving mechanism: 8 days  
dimensions of cabinet: 460 mm height x 420 mm width x 250 mm depth  
total height: 1010 mm, weight\*): 21.5 kg

different ranges possible:  
0 ... 40 m/s (standard)  
0 ... 60 m/s  
0 .... 334 km/h for highest wind forces (special range)

**82b** Anemograph "Universal" with continuous chart recording,  
consisting of:  
Transmitter No. 82aG - with wind vane, Pitot tube and cupwheel (cover-photo)  
height: 1180 mm, weight\*): 19.5 kg  
Continuous Chart Recorder 82aB - in metal cabinet with glazed door  
paperfeed: 20 mm/h  
period of running of driving mechanism: 1 month  
dimensions of cabinet: 460 mm height x 520 mm width x 250 mm depth  
total height: 1010 mm, weight\*): 22.5 kg

different ranges possible:  
0 ... 40 m/s (standard)  
0 ... 60 m/s  
0 .... 334 km/h for highest wind forces (special range)

### **Accessories for No. 82a resp. 82b (no additional charge):**

8 m transmission rods and pressure tube for each measuring element, in lengths of 2 m  
1 mast closing flap  
10 rod couplings  
2 hose connecting pieces  
4 m rubber connecting hose  
1 Set = 100 charts No. 77b (only No. 82a) resp.  
6 rolls recording paper No. 82b/20 for 34 days, each (only No. 82b)  
1 bottle of special ink No. 1095V  
4 spare capillary pens No. 1013G  
1 Glass capillary recording pen with ink container No. 82k  
1 copy of operating and mounting instructions  
100 ml oil for the transmitter  
50 ml oil for the recorder  
100 ml paraffin oil for the float chamber

## **Mast and Accessories for Mounting the Wind Measuring Installations**

- 82m** Pipe Mast  
similar to fig. 10, consisting of steel pipe with upper fixing flange, ladder support, clamp to take up three bracing wires, two lower clamps for fastening to wall of building and relief, every item with rustproof coating, incl. 40 m of bracing wires and the corresponding cable clamps and thimbles, as well as three zinc-coated turnbuckles  
Length: 6 m weight: 82 kg
- 82n** Pipe Mast  
as per fig. 10, described above, but with special ladder support, incl. two obstruction lamps, in weatherproof casing, with terminal box and cable end pieces  
Length: 6 m weight: 92 kg
- 82z** Mast Extension\*)  
**2 ... 6** consisting of a steel pipe with two welded on flanges and fastening screws  
Length: 2 ... 6 m, according to request  
Weight: In the case of 2 m length, 28 kg. Every other, additional meter 10 kg, more.
- 82v** 1 Second set of bracing material for free lengths of mast above 8 m, consisting of 50 m of bracing cable, cable clip, cable clamps and thimbles, as well as three zinc-coated turnbuckles  
weight: 15 kg
- 82x** 1 Pair Transmission Rods\*)  
for wind direction and wind run, 2 m in length, each  
weight: 0.8 kg
- 82 y** 1 Pair of Pressure Tubes\*)  
for transmission of dynamic and static pressures, 2 m in length, each  
weight: 1.3 kg
- 82s** Climbing Irons  
for heretofore named masts 82m and 82n, number corresponding to length of mast above roof  
Distance between them 0.4 m weight per piece: 1.3 kg
- 1091c** 1 Pair Console Angles  
for mounting of the recorder  
weight: 5 kg

\*) In the case of mast lengths over 6 m, transmission rods and pressure tubes, too, must be ordered at the corresponding lengths.

## **Spare Parts**

- 77b** 1 Set = 100 sheets recording paper weight: 1.6 kg
- 82b/20** 6 Rolls recording paper, paperfeed 20 mm/h, for monthly recording  
(0...40m/s)
- 82k** Spare recording pen, complete
- 1013g** Glass capillary, only
- 1095v** 1 Bottle of recording ink

**DR. ALFRED MÜLLER**  
**METEOROLOGISCHE INSTRUMENTE KG**  
Chausseestraße 39 / 42c  
D-15712 Königs Wusterhausen

**Tel.:** +49 3375 9025-32  
**Fax:** +49 3375 9025-36  
**e-mail:** info@meteomueller.de  
**www.rfuess-mueller.de**