

VAISALA
BAROMETER
WA15 WIND SYSTEM



PTB330 Digital Barometer for Professional Meteorology, Aviation, and Industrial Users



Vaisala BAROCAP® Digital Barometer PTB330 with a new trend display.

Vaisala BAROCAP® Digital Barometer PTB330 is a new generation barometer, designed for a wide range of high-end atmospheric pressure measurement. The pressure measurement of the PTB330 is based on the Vaisala in-house, silicon

Features/Benefits

- Vaisala BAROCAP® sensor
- Accurate measurement
- Excellent long-term stability
- Added reliability through redundancy
- Graphical trend display with 1-year history data
- Height and altitude corrected pressure (QFE, QNH)
- For professional meteorology and aviation, laboratories, demanding industrial applications

capacitive, absolute pressure sensor - the Vaisala BAROCAP® Sensor. It provides high measurement accuracy and excellent long-term stability.

Highly Accurate

The PTB330 series is highly accurate. The Class A barometers for the most demanding applications are fine-tuned and calibrated against a high-precision pressure calibrator. Class B barometers are adjusted and calibrated using electronic working standard. All the PTB330 barometers come with a NIST traceable, factory calibration certificate.

Reliability through Redundancy

According to customers' choice, the PTB330 can incorporate one, two or three BAROCAP® sensors. When two or three sensors are used, the barometer continuously compares the readings of the pressure sensors

against one another and provides information on whether these are within the set internal difference criteria. This unique feature provides redundancy in pressure measurement.

Thus, users also get a stable and reliable pressure reading at all times as well as a pre-indication of when to service or recalibrate the barometer.

QNH and QFE

The PTB330 can be set to compensate for QNH and QFE pressure used especially in aviation. The QNH represents the pressure reduced to sea level, based on the altitude and temperature of the observation site. The QFE represents the height corrected pressure of small differences in altitude, for example, the air pressure at the airfield elevation.

Graphical Display

The PTB330 features a multi-lingual, graphical display allowing users to monitor measurement trends. The graph is updated automatically while measuring and it provides a one-year measurement history. In addition to instant pressure, the PTB330 also provides the WMO pressure trend and tendency codes.

Applications

The PTB330 can be used successfully for aviation, professional meteorology, and for demanding industrial pressure measurement applications such as accurate laser interferometric measurement and exhaust gas analysis in engine test benches.



Technical Data

Performance

BAROMETRIC PRESSURE RANGE 500 ... 1100 hPa		
	Class A	Class B
Linearity*	±0.05 hPa	±0.10 hPa
Hysteresis*	±0.03 hPa	±0.03 hPa
Repeatability*	±0.03 hPa	±0.03 hPa
Calibration uncertainty**	±0.07 hPa	±0.15 hPa
Accuracy at +20 °C (+68 °F) ***	±0.10 hPa	±0.20 hPa

BAROMETRIC PRESSURE RANGE 50 ... 1100 hPa		
	Class B	
Linearity*	±0.20 hPa	
Hysteresis*	±0.08 hPa	
Repeatability*	±0.08 hPa	
Calibration uncertainty**	±0.15 hPa	
Accuracy at +20 °C ***	±0.20 hPa	

TEMPERATURE DEPENDENCE****		
500 ... 1100 hPa	±0.1 hPa	
50 ... 1100 hPa	±0.3 hPa	

TOTAL ACCURACY -40 ... +60 °C (-40 ... +140 °F)		
	Class A	Class B
500 ... 1100 hPa	±0.15 hPa	±0.25 hPa
50 ... 1100 hPa	±0.45 hPa	

LONG-TERM STABILITY		
500 ... 1100 hPa	±0.1 hPa/year	
50 ... 1100 hPa	±0.1 hPa/year	

* Defined as ±2 standard deviation limits of endpoint non-linearity, hysteresis or repeatability error.
 ** Defined as ±2 standard deviation limits of inaccuracy of the working standard including traceability to NIST.
 *** Defined as the root sum of the squares (RSS) of endpoint non-linearity, hysteresis error, repeatability error and calibration uncertainty at room temperature.
 **** Defined as ±2 standard deviation limits of temperature dependence over the operating temperature range.

Operating Environment

Pressure range	500 ... 1100 hPa, 50 ... 1100 hPa
Temperature range	
operating	-40 ... +60 °C (-40 ... +140 °F)
with local display	0 ... +60 °C (+32 ... +140 °F)

Data Transfer Software

MI70 Link Interface Software	
Requirement:	Microsoft® Windows OS Microsoft® Excel

Inputs and Outputs

Supply voltage	10 ... 35 VDC	
Supply voltage sensitivity	negligible	
Typical power consumption at +20 °C (U _{in} 24 VDC, one pressure sensor)		
RS-232	25 mA	
RS-485	40 mA	
U _{out}	25 mA	
I _{out}	40 mA	
display and backlight	+20 mA	
Serial I/O	RS232C, RS485/422	
Pressure units	hPa, mbar, kPa, Pa inHg, mmH ₂ O, mmHg, torr, psia	
	Class A	Class B
Resolution	0.01 hPa	0.1 hPa
Settling time at power-up (one sensor)	4 s	3 s
Response time (one sensor)	2 s	1 s
Acceleration sensitivity	negligible	
Pressure connector	M5 (10-32) internal thread	
Pressure fitting	barbed fitting for 1/8" I.D. tubing or quick connector with shutoff valve for 1/8" hose	
Maximum pressure limit	5000 hPa abs.	
Compliance	EMC standard EN61326-1:1997 + Am1:1998 + Am2:2001: Industrial Environment	

Mechanics

Housing material	G AlSi10 Mg (DIN 1725)
Housing classification	IP66
	IP65 (NEMA4) with local display
Weight	1 - 1.5 kg

Analog Output (optional)

Current output	0 ... 20 mA, 4 ... 20 mA	
Voltage output	0 ... 1 V, 0 ... 5 V, 0 ... 10 V	
Accuracy at pressure range	500 ... 1100 hPa	50 ... 1100 hPa
at +20 °C	±0.30 hPa	±0.40 hPa
at -40 ... +60 °C	±0.60 hPa	±0.75 hPa

Accessories

Serial interface cable	19446ZZ
USB-RJ45 serial connection cable	219685
Software interface kit	215005
Wall mounting kit	214829
Outdoor installation kit (weather shield)	215109
Installation kit for pole or pipeline	215108
Power supply module	POWER-1
Temperature compensated analog output module	AOUT-1T
Isolated RS-485 module	RS485-1
DIN Rail Kit	215094

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Please contact us at
www.vaisala.com/requestinfo



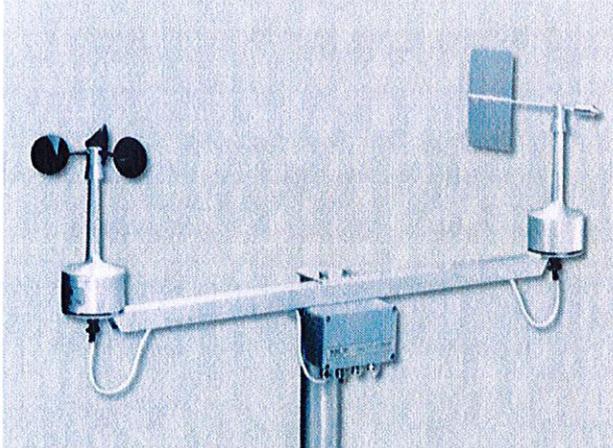
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WA15 Wind Set for High Performance Wind Measurement



The WA15 is based on accurate sensors installed on a large crossarm. It is designed for demanding wind measurement applications.

With a proven track record of successful installations, the Vaisala Wind Set WA15 has earned its reputation as the industry standard in the wind sensor market.

The WA15 consists of a Vaisala Anemometer WAA151, a Vaisala Wind Vane WAV151, an optional crossarm, a power supply and cabling.

Anemometer with excellent linearity

The WAA151 is a fast response, low-threshold anemometer. Three lightweight, conical cups mounted on the cup wheel, provide excellent linearity over the entire operating range, up to 75 m/s.

A wind-rotated chopper disc attached to the shaft of the cup wheel cuts an infrared light beam 14 times

Features/Benefits

- High-performance wind measurement set
- Long and successful track record in meteorological applications
- Accurate wind speed and direction measurement
- Low measurement starting threshold
- Conical anemometer cups provide excellent linearity
- Heated shaft prevents bearings from freezing

per revolution. This generates a pulse output from the phototransistor.

The output pulse rate is directly proportional to wind speed (e.g. 246 Hz = 24.6 m/s). However, for the highest accuracy, the characteristic transfer function should be used to compensate for starting inertia.

(See technical data.)

Sensitive wind vane

The WAV151 is a counter-balanced, low-threshold, optoelectronic wind vane. Infrared LEDs and phototransistors are mounted on six orbits on each side of a 6-bit GRAY-coded disc. Turned by the vane, the disc creates changes in the code received by the phototransistors. The output code resolution is $\pm 2.8^\circ$.

Heated bearings withstand cold weather

Heating elements in the shaft tunnels of both the anemometer and vane keep the bearings above freezing in cold climates.

Complete package available

The anemometer and vane are designed to be mounted on Vaisala crossarms.

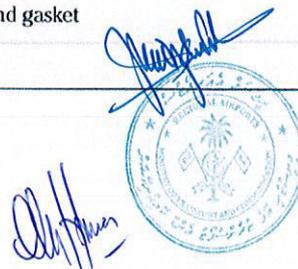
The WHP151 power supply provides the operating and heating power needed for the WA15. The power supply, as well as the signal and power cables are available as options.

Technical data

Vaisala Wind Set WA15

Options and accessories

Crossarm and termination box	WAC151
16-lead signal cable	ZZ45048
6-lead power cable	ZZ45049
Crossarm and analog transmitter	WAT12
6-lead cable for signal and power	ZZ45049
Crossarm and serial RS485 transmitter	WAC155
Serial RS485 transmitter card	WAC155CB
Power supply	WHP151
Set of bearings and gasket	16644WA
Cup assembly	7150WA
Tail assembly	6389WA



Technical data

Vaisala Anemometer WAA151

Wind speed

Measurement range	0.4 ... 75 m/s
Starting threshold	< 0.5 m/s *
Distance constant	2.0 m
Characteristic transfer function	$U = 0.328 + 0.101 \times R$ (where U = wind speed [m/s], R = output pulse rate [Hz])
Accuracy (within range 0.4 ... 60 m/s)	
with characteristic transfer function	$\pm 0.17 \text{ m/s}^{**}$
with transfer function $U = 0.1 \times R$	$\pm 0.5 \text{ m/s}^{***}$

General

Operating power supply	$U_{in} = 9.5 \dots 15.5 \text{ VDC}$, 20 mA typical
Heating power supply	AC or DC 20 V, 500 mA nominal
Output	0 ... 750 Hz square wave
Transducer output level	
with $I_{out} < +5 \text{ mA}$	high state $> U_{in} - 1.5 \text{ V}$
with $I_{out} > -5 \text{ mA}$	low state $< 2.0 \text{ V}$
Settling time after power turn-on	< 30 μs
Plug 6-PIN	MIL-C-26482 type
Cabling	6-wire cable through crossarm
Recommended connector at cable end	SOURIAU MS3116F10-6P
Operating temperature with heating	-50 ... +55 °C (-58 ... +131 °F)
Storage temperature	-60 ... +70 °C (-76 ... +158 °F)
Material	
housing	AlMgSi, grey anodized
cups	PA, reinforced with carbon fibre
Dimensions	240 (h) \times 90 (\varnothing) mm
Swept radius of cup wheel	91 mm
Weight	570 g

Test compliance

Wind tunnel tests	ASTM standard method D5096-90
Exploratory vibration test	MIL-STD-167-1
Humidity test	MIL-STD-810E, Method 507.3
Salt fog test	MIL-STD-810E, Method 509.3

Complies with EMC standard EN61326-1:1997 + Am1:1998 + Am2:2001; Generic Environment

* Measured with cup wheel in position least favoured by flow direction. Optimum position gives approx. 0.35 m/s threshold.

** Standard Deviation

*** Typical error vs. speed with the "simple transfer function" used.

RANGE (m/s)	0.3	3.10	10.17	17.24	24.31	31.37	37.44	44.51	51.58	58.65
ERROR (m/s)	-0.4	-0.3	-0.2	-0.1	0.0	+0.1	+0.2	+0.3	+0.4	+0.5

Vaisala Wind Vane WAV151

Wind direction

Measurement range at wind speed 0.4 ... 75 m/s	0 ... 360°
Starting threshold	< 0.4 m/s
Resolution	$\pm 2.8^\circ$
Damping ratio	0.19
Overshoot ratio	0.55
Delay distance	0.4 m
Accuracy	better than $\pm 3^\circ$

General

Operating power supply	$U_{in} = 9.5 \dots 15.5 \text{ VDC}$, 20 mA typical
Heating power supply	AC or DC 20 V, 500 mA nominal
Output code	6-bit parallel GRAY
Output levels	
With $I_{out} < +5 \text{ mA}$	high state $> U_{in} - 1.5 \text{ V}$
With $I_{out} > -5 \text{ mA}$	low state $< 1.5 \text{ V}$
Settling time after power turn-on	< 100 μs
Plug 10-PIN	MIL-C-26482 type
Cabling	10-wire cable through crossarm
Recommended connector at cable end	SOURIAU MS3116F12-10P
Operating temperature with heating	-50 ... +55 °C (-58 ... +131 °F)
Storage temperature	-60 ... +70 °C (-76 ... +158 °F)
Material	
housing	AlMgSi, grey anodized
wave	Alsi 12 anodized
Dimensions	300 (h) \times 90 (\varnothing) mm
Swept radius of vane	172 mm
Weight	660 g

Test compliance

Wind tunnel tests	ASTM standard method D 5366-93 (for starting threshold, distance constant, transfer function)
Exploratory vibration test	MIL-STD-167-1
Humidity test	MIL-STD-810E, Method 507.3
Salt fog test	MIL-STD-810E, Method 509.3

Complies with EMC standard EN61326-1:1997 + Am1:1998; Am2:2001; Generic Environment

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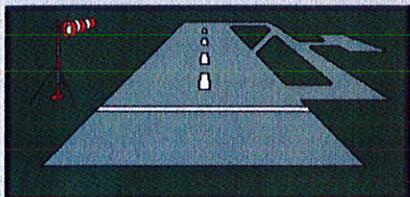
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CE



Wind Direction Indicator

WDI

DOC 1603.E

Revision 3.0 01/01/08

Utilisation

- Wind Direction Indicator

Compliance with Standards

- ICAO : Annex 14 Volume I
Paragraph 5.1.1
- French STAC



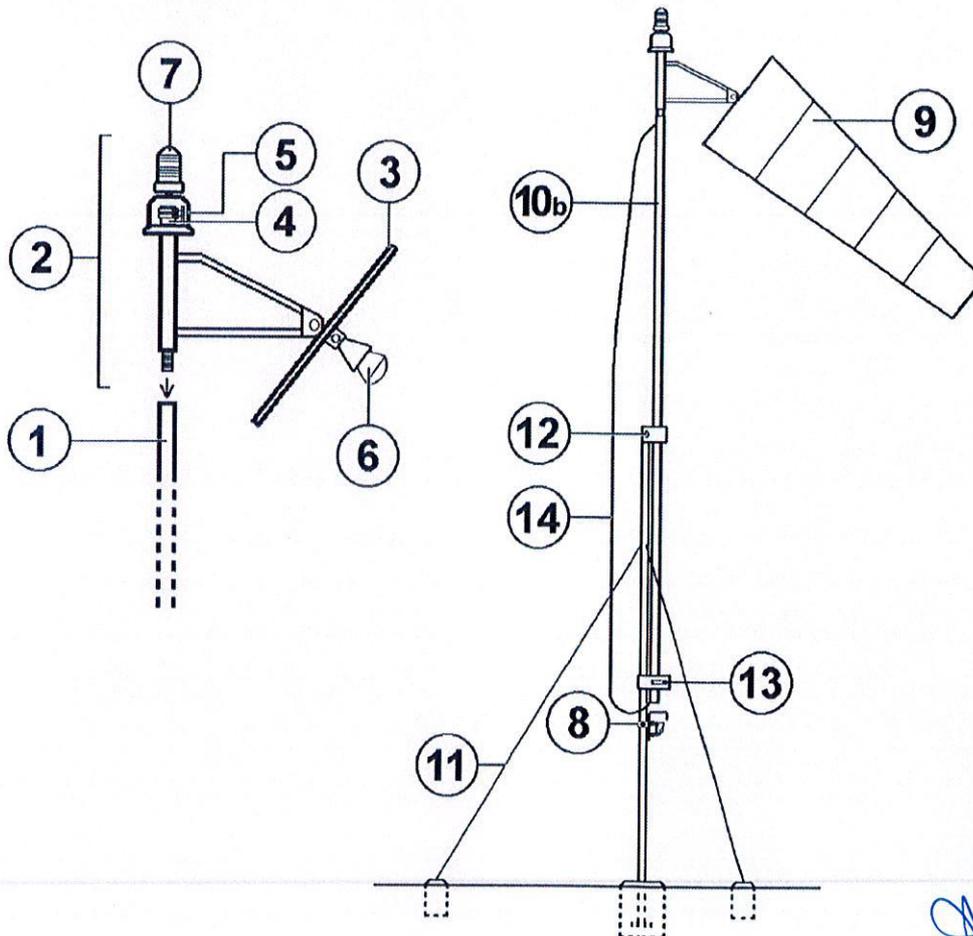
WDI Wind Direction Indicator

Main advantages

- Stayed and Non Stayed version.
- Long life of the Sock made in long lasting synthetic textile.
- The wind sock can be (as an option) internally illuminated.
 - Low power consumption : Lower than 150 Watts.
 - Lamp life greater than 4,000 hours.
 - Better luminance which is evenly distributed up to the extremity of the sock.
 - No loss of light which may cause disturbance.
 - Increased safety, as the entire unit forms an obstruction whose overall height is cut by 2 m owing to the elimination of the lighting holding devices.
- The wind sock can be (as an option) equipped on its top with a F2-1 obstruction light.
 - Low power consumption : lower than 55 Watts.
 - Lamp life greater than 8,000 hours.
- Power Supply : Standard 230 Vac 50 / 60 Hz or (on Request) 6,6 Amp for supply through series circuit.
- Easy Maintenance. The tilt mast support of the WDI give easy access to the Sock and to the Lamps.
 - High speed replacement of the Sock.
 - High speed replacement of the Lighting lamp.
 - High speed replacement of the Obstruction lamp.

Design

- 1) Galvanised Steel Mast
- 2) Vane Mounted on Ball Joints
- 3) Rocker of the Sock
- 4) Lighting Power Supply Collectors
- 5) Cover of Lighting Power Supply Collectors
- 6) Sock Lighting Floodlight with
PAR 38, 150 Watts / 230 Volts Lamp
PAR 38, 45 Watts / 6.6 Amps Lamp
- 7) Obstruction F2-1 Fitting (Option) with
E27, 55 Watts / 230 Volts Lamp
Pk30d, 45 Watts / 6,6 A Lamp
- 8) Watertight Power Supply Switch (Option)
- 9) Sock made in Long Lasting Synthetic textile
- 10a) Non Stayed Tilt mast
- 10b) Stayed Tilt mast
- 11) Stays, shackles and stretchers (Stainless steel)
- 12) Articulation axis of the tilt section
- 13) Locking Key
- 14) Manoeuvring Sling

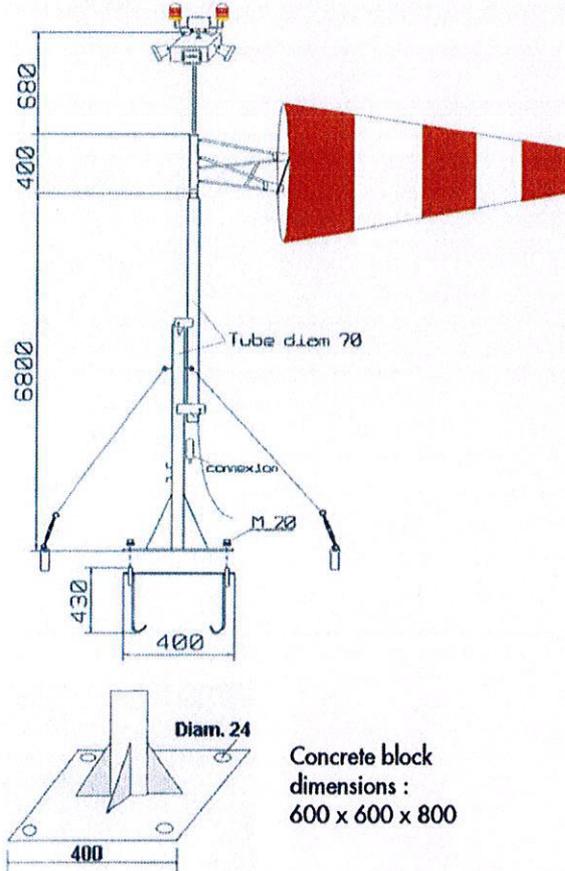


WDI Wind Direction Indicator

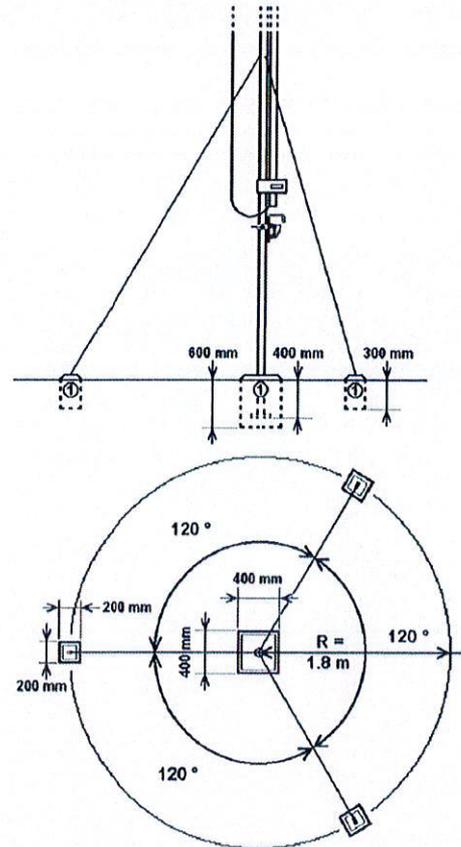
Technical characteristics

- Overall Height: Less than 7.5 m.
- Lamps (Option): **Socket Lighting** : PAR 38 socket lamp of 150 Watts (230 Vac). Lamp life greater than 4,000 hours.
 PAR 38 socket lamp of 45 Watts (6.6 Amps). Lamp life greater than 4,000 hours
- Obstacle** : E27 socket lamp of 55 Watts (230 Vac). Lamp life greater than 8,000 hours.
 Pk30d socket lamp of 45 Watts (6.6 Amps). Lamp life greater than 1,000 hours.
- Power Supply: 230Vac using 2x4mm² cable (Standard) or 6,6A using 2x4mm² cable through an Isolating Transformer (Option)
- Finish: All the metallic parts are made in Galvanised Steel finished and covered with two coats of alternate Red and White
- Wind Sock: The sock (coloured alternatively Red and White) is made in long lasting synthetic textile, exist in two sizes.
- 1) Length = 4,5 m, Diameter = 1 m
 2) Length = 2,25 m, Diameter = 0,6 m

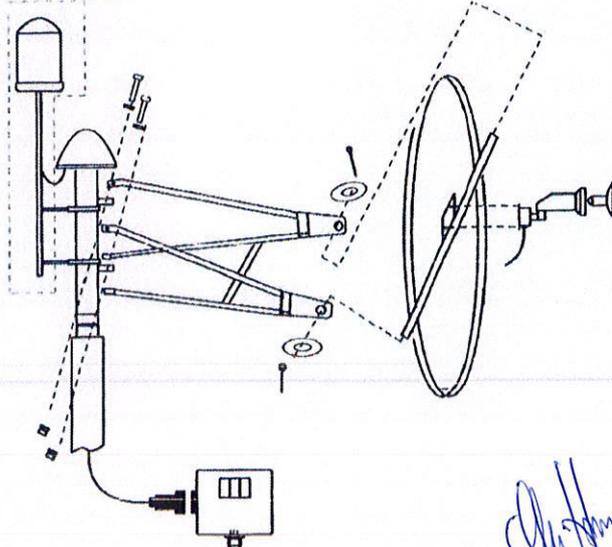
Installation



Concrete block
 dimensions :
 600 x 600 x 800



Options



THORN

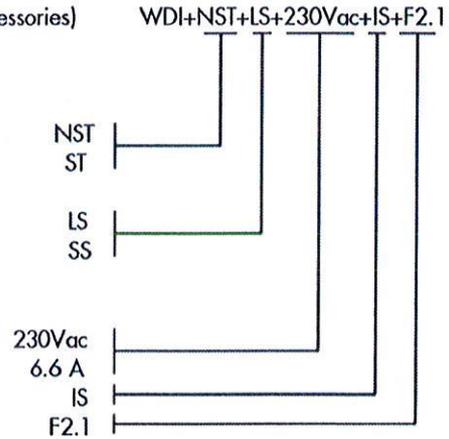
Airfield Lighting

WDI

Ordering Code

WDI = Tiltable mast (with its mounting accessories)

- + Vane
- + wind sock
- Tiltable Mast
 - . Non Stayed Mast
 - . Stayed Mast
- Wind sock
 - . length = 4,5 m, Diameter = 1 m
 - . length = 2,25 m, Diameter = 0,6 m
- Illuminated WDI (Option)
 - . Power supply
 - . 230 Vac
 - . 6.6 A
 - . Illuminated sock
 - . F2.1 Obstruction light



Cardboard packing data

Designation	Volume in m ³	Dimensions in cm	Weight in kg
Tiltable Mast	0.21	550 x 25 x 15	80
1 x 4,5m Wind sock + Vane	1.26	200 x 150 x 60	60
0,6 x 2,25 m Wind sock + Vane	0.27	54 x 65 x 75	40

Specification

The Wind Direction Indicator WDI shall comply with ICAO recommendations in Annex 14, Volume I, paragraph 5.1.1, with STNA standards.

It shall be support by stayed or non stayed tilt mast.

Two sizes of Sock will be available 1 m x 4.5 m or 0.6 m x 2.25 m.

Its overall size will be less than 7.5 m.

All the metallic parts of the WDI will be in galvanised steel finished and covered with two coats of alternate Red and White paint. All fixings and fastening shall be stainless steel.

The Sock will be made in long lasting synthetic textile.

As an Option the WDI sock will be internally

illuminated with one PAR38 lamp not exceeding 150 Watts. Lamp life shall be greater than 4,000 hours.

As an Option the WDI will be equipped with one F2-1 Obstruction light with one E27 (or Pk30d) lamp not exceeding 55 Watts. E27 Lamp life shall be greater than 8,000 hours.

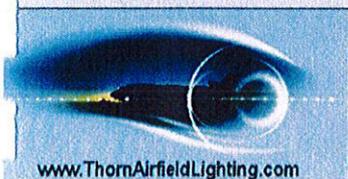
In the case of Illuminated WDI this one will be powered supply in standard with 230 Vac. As an option the WDI can be delivered in a version allowing Power Supply in 6,6 Amps through a standard Airfield Lighting current loop.

Maintenance operations as new sock installation or lamps replacement will be easy and high-speed using facilities of the tilt mast.

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ATC LIGHT GUN



Multi

ELECTRIC



TSG

Traffic Signal Light Guns

Compliant with: MIL-L-6671
Type B-2
MIL-L-25971
Type SDU-4/U



Model 970

General Description

The Type B-2 Aircraft Traffic Light or Light Gun has been a familiar item in Military Airport Control Towers since before 1950s. The two-handle design allows accurate aiming of the light signal to aircraft and ground traffic when it is not practical or unavailable for normal radio communications. The type SDU-4/U is a single handle Traffic Light. This unit is made to hold and operate with one hand. The Multi Electric 970 is the two handle Type B-2 TSG while the Model 975 is the single handle TLG.

Three light colors are available in a concentrated 200,000Cd white light and the equivalent reduced red or green signal. Each unit is made to operate typically from a 115 V 25 to 60Hz or with optional 220 V or Battery Supply.

How To Order

The Basic part number for the Type B-2 Two Handle TLG is Multi Electric Model 970. The single handle SDU-4/U is Multi Electric Model 975.

Cat No.	Description
970	Type B-2 Aircraft Traffic Light with Transformer Power Supply
975	Type SDU-4/U Aircraft Traffic Light with Transformer Power Supply
970-36-1	115 V 25-60 Hz Transformer for the Model 970
970-36-2	220V 25-60 Hz Transformer for the Model 970
975-36-1	115V 25-60 Hz Transformer for the Model 975
975-36-2	220V 25-60 Hz Transformer for the Model 975
970-36A-1	High Output Power Supply for the Model 970
970-36A-2	High Output Power Supply for the Model 970
975-36A-1	High Output Power Supply for the Model 975
975-36A-2	High Output Power Supply for the Model 975
978	Fitted Storage and Shipping Chest
970-65	Suspension Kit with Coiled Cord



Model 975

International Standard Traffic Signal Light Patterns

Color and Type of Signal	Movement of Vehicles, Equipment and Personnel	Aircraft on the Ground	Aircraft in Flight
Steady Green	Cleared to cross, proceed or go	Cleared for takeoff	Cleared to land
Flashing Green	Not applicable	Cleared for taxi	Return for landing (followed by steady green)
Steady Red	STOP	STOP	Give way to other aircraft and continue circling
Flashing Red	Clear the taxiway/runway	Taxi clear of the runway in use	Airport unsafe, do not land
Flashing White	Return to starting point on airport	Return to starting point on airport	Not applicable
Alternating Red and Green	Exercise Extreme Caution	Exercise Extreme Caution	Exercise Extreme Caution

Replacement Parts

Part No.	Description	Part No.	Description
970-24	Parabolic Reflecting Mirror	970-30	Lamp
970-28	Red Filter	970-26	Control Belt Model 970
970-29	Green Filter	975-26	Control Belt Model 975

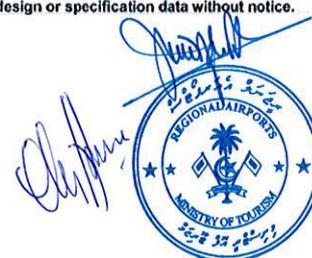
Contact the factory with any questions or special requirements you may have.

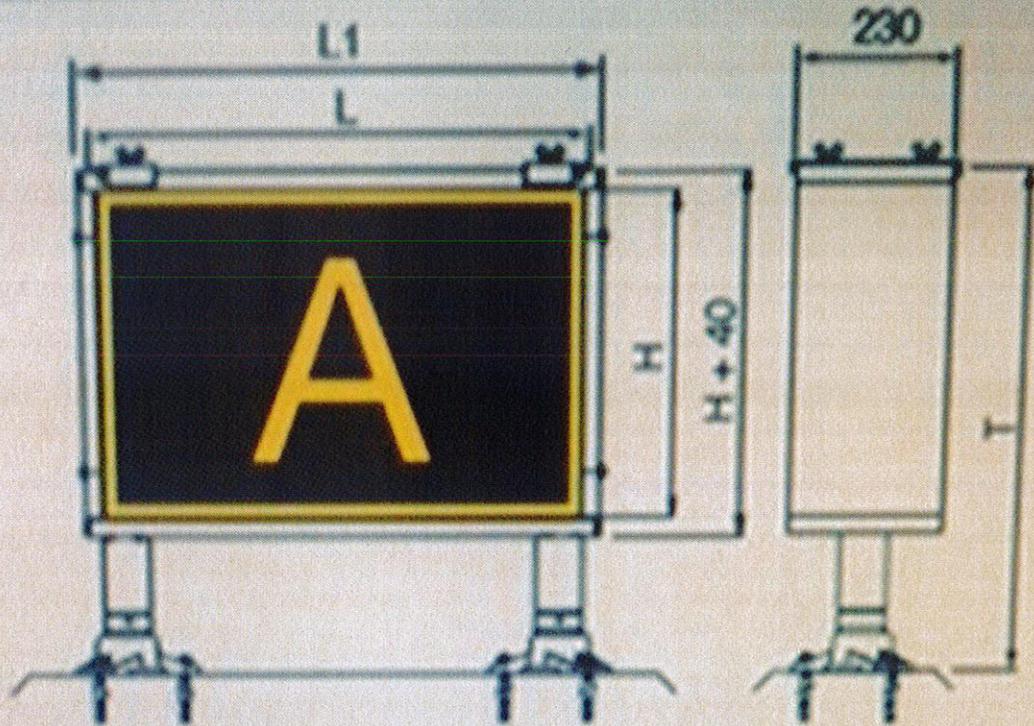
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We reserve the right to changedesign or specification data without notice.

KT-1.2 October 2001





L (mm)	700	900	1100	1300	1500	1700	1900
L1 (mm)	748	948	1148	1349	1550	1750	1951
Qty of lamps	1	2	2	3	3	4	4

L (mm)	2100	2300	2500	2700	2900	3300	3700
L1 (mm)	2151	2351	2552	2752	2953	3352	3752
Qty of lamps	4	5	5	6	6	8	8

H = 400, 600 or 800 mm
 Symbol height = H/2
 T = 620, 820 or 1020 mm.

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