MATRICE DI REVISIONE

REV	DATA	DESCRIZIONE MODIFICA
0		
1		
2		
3		
4		
5		

N.B.: LA TAVOLA SOSTITUISCE QUELLA RELATIVA AL CODICE | E | | | | | | | | DEL PROGETTO ESECUTIVO

CONCESSIONI AUTOSTRADALI LOMBARDE

Autostrada Pedemontana Lombarda

COLLEGAMENTO AUTOSTRADALE
DALMINE - COMO - VARESE - VALICO DEL GAGGIOLO E OPERE AD ESSO CONNESSE

CODICE C.U.P. F11B06000270007

TRATTE B1, B2, C, D, TRVA13+14, GREENWAY

AS BUILT

TRATTA B1 - SVINCOLO DI LOMAZZO (da Pk -0+850 a Pk +1+800)

IMPIANTI

TIPOLOGICI

SCHEDA QUADRO E PALO STAZIONE METEO

IDENTIFICAZIONE ELABORATO

CODICE PROGETTO: F00107B

WBS								
FASE PROGETTUALE	LOTTO	ZONA	OPERA	TRATTO D'OPERA	AMBITO	TIPO ELABORATO	PROGRESSIVO	REVISIONE
A	0	A0X	IE000	0	IM	DK	016	E

Scala: -

DATA	DESCRIZIONE	REV
Settembre 2015	Emissione	E

CONCEDENTE

CONCESSIONI AUTOSTRADALI LOMBARDE

CONCESSIONARIO

Autostrada Pedemontana Lombarda

Direttore Tecnico: Ing. Enrico Arini

Referente Tecnico: Ing. Giuseppe Bilancia

APPROVATO

Autostrada Pedemontana Lombarda

Il Direttore dei Lavori: Ing. Francesco Domanico

IMPRESA

RAGGRUPPAMENTO TEMPORANEO IMPRESE:

Mandataria	*Mandante*	*Mandante*	*Mandante cooptata*
STRABAG A.G.	GLF Grandi Lavori Fincosit S.p.A.	Impresa costruzioni Giuseppe Maltauro S.p.A.	STRABAG S.p.A.

STRABAG — GLF spa GRANDI LAVORI FINCOSIT — IMPRESA COSTRUZIONI GIUSEPPE MALTAURO S.p.A. — STRABAG

PROGETTISTA - PROGETTO ESECUTIVO DI DETTAGLIO

RAGGRUPPAMENTO TEMPORANEO PROGETTISTI:

Mandataria	*Mandante*	*Mandante*	*Mandante*
3TI PROGETTI ITALIA INGEGNERIA INTEGRATA S.p.A.	GP ingegneria srl GESTIONE PROGETTI DI INGEGNERIA	coopprogetti	Arch. Salvatore Vermiglio

RESPONSABILE DI PROGETTO ED INCARICATO DELL'INTEGRAZIONE FRA LE VARIE PRESTAZIONI:

Ing. Alberto Cecchini

Dott. Ing. Alberto Cecchini — Ordine Ingegneri Roma n° 15158

ELABORAZIONE PROGETTUALE

PROGETTISTA:

3TI PROGETTI ITALIA S.p.A

3TI ITALIA S.p.A.
DIRETTORE TECNICO
Ing. Stefano Luca Possati
Ordine degli Ingegneri
Provincia di Roma n. 20809

Redatto: Muzi | Verificato: Sorge | Approvato: Possati

SVINCOLO LOMAZZO

COLLEGAMENTO AUTOSTRADALE
DALMINE – COMO – VARESE – VALICO DEL GAGGIOLO
ED OPERE AD ESSO CONNESSE
TRATTA B1 DA Pk 0+850 A Pk 1+800

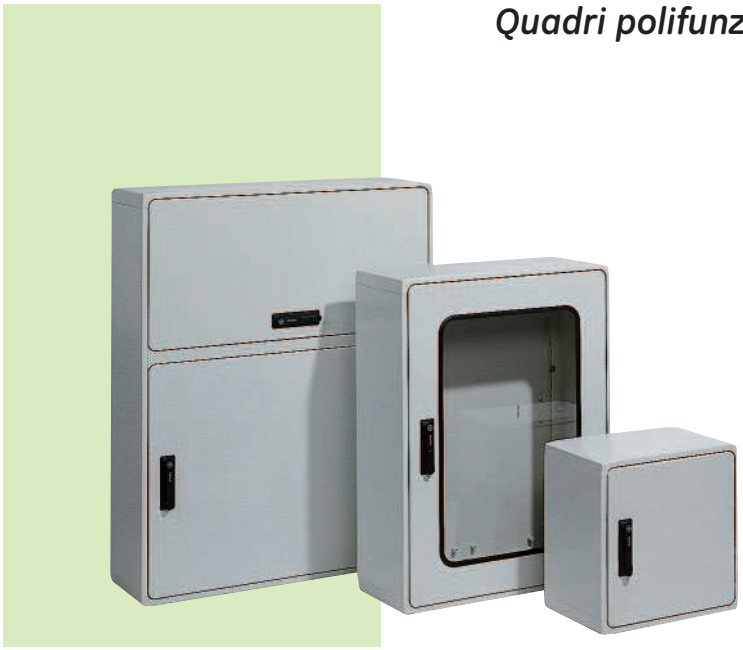
IMPIANTI TECNOLOGICI

SCHEDA PRODOTTO
070

QUADRO E PALO
PER STAZIONE METEO

DOCUMENTAZIONE AS-BUILT

Quadri polifunzionali in poliestere



Norme

IEC 60529	EN 60529
IEC 62208	EN 62208
IEC 62262	EN 62262

Omologazioni

- Quadri con una porta:
  tipo 3, 3R, 3S, 4, 4X, 12, 12K e 13
- Quadri con due porte:
  tipo 3, 3R, 3S, 4, 4X, 12, 12K e 13
- Quadri accoppiati:
  tipo 3, 3R, 3S, 12, 12K e 13

Lloyd's Register of Shipping

Condizioni ambientali

- Installazione sia all'esterno che all'interno a temperature comprese tra -50°C e 70°C in condizioni di esercizio con picchi e picco di temperatura 150°C. Altitudine massima di installazione 2000 mt.
- Installazione in ambienti sotterranei
- Adatti per ambiente marino o con atmosfera corrosiva

Caratteristiche

- 14 dimensioni standard (da 500 x 500 mm fino a 1250 x 1000 mm) con profondità di 320 mm
- Normalmente assemblati in fabbrica (vuoti o equipaggiati)
- Alto grado di protezione: **IP65**-IK10 (20J) in accordo con le norme IEC 60529 e EN/IEC 62262 (IP55 - IK07 per quadri con porta finestrata).
- Materiale: poliestere rinforzato con fibra di vetro, stampato a caldo, autoestinguente ed esente da alogeni (ecologico)
- Colore: grigio RAL 7035, uniforme nella massa
- Progettato per l'installazione a pavimento, parete e palo
- Possibilità di accoppiamento in altezza, larghezza e profondità
- Doppio isolamento ⧈
- Porte con meccanismo di chiusura su 5 punti
- Possibile l'esecuzione come quadro stradale
- Tensione nominale di isolamento Ui = 1000V
- Facilmente riciclabile: assenza di parti metalliche annegate nel poliestere

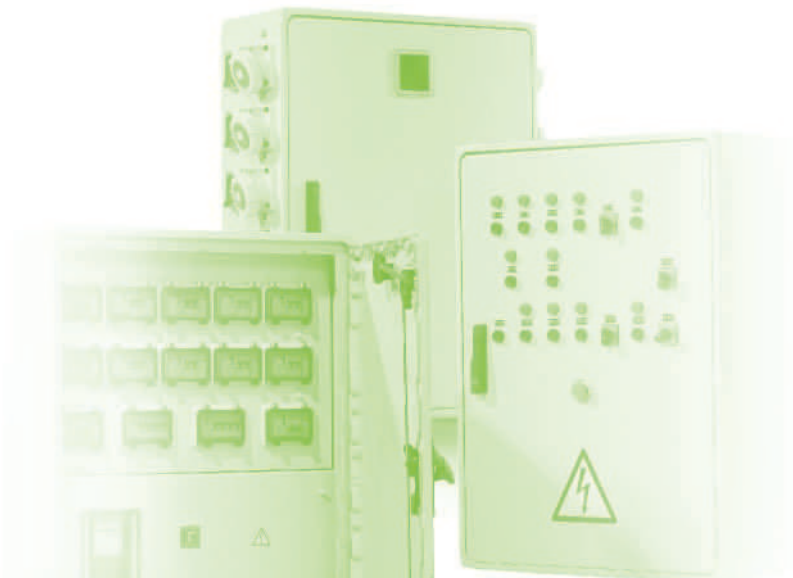
Panorama della gamma ● Pagina G.3
Dimensioni d'ingombro ● Pagina G.62

Applicazioni

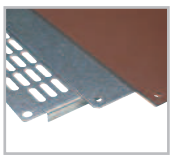
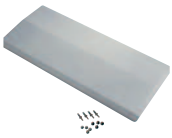
- **Commerciale**
  Aree utilizzate per mercati, campeggi, porti turistici, parchi di divertimento, stazioni di servizio, autolavaggi, lavanderie, cantieri stradali, ...

- **Industriale**
  Cantieri navali, miniere, fabbriche automobilistiche, cartiere, produzione di alimentari e bevande, petrolchimico, industria pesante, settore della trasformazione, sistemi di monitoraggio, ...

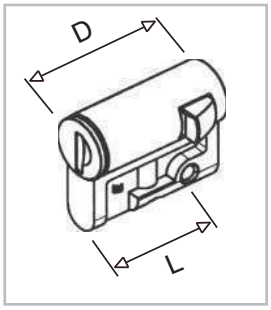
- **Aziende pubbliche**
  Impianti trattamento acque, impianti di depurazione, telecomunicazioni, impianti semaforici, gestione del traffico, trasporti pubblici, distribuzione di energia (elettrica, gas, acqua), televisione via cavo (CATV), illuminazione pubblica, ferrovie e tramvie, ...



Quadri polifunzionali in poliestere

	Profondità = 320 mm	PS 220	PS 230	PS 320	PS 330	PS 340
	**Quadri IP65 - IK10 assemblati in fabbrica** Completi di maniglia e squadrette in acciaio AISI 304 per montaggio a parete (chiusura e chiave fornita come accessorio).		↓			
	Dimensioni (A x L)	500 x 500	500 x 750	750 x 500	750 x 750	750 x 1000
	Porta cieca	**833000**	**833004**	**833008**	**833012**	**833016**
	Porta finestrata (in policarbonato trasparente) (IP55)	**833001**	**833005**	**833009**	**833013**	**833017**
	Peso (kg)	16	19	20	25	30
	**Quadri con porte frontali e posteriori**	**833076**	**833086**	**833219**	**833373**	**833077**
	**Piastre di montaggio** Dimensioni (A - 110 mm x L - 110 mm)		↓			
	Lamiera zincata Sendzimir 2 mm	**833500**	**833501**	**833501**	**833502**	**833504**
	Preforata 2 mm	**833516**	**833517**	**833518**	**833519**	**833520**
	Pertinax 5 mm	**833508**	**833509**	**833509**	**833510**	**833512**
	Pertinax 10 mm	-	-	-	-	-
	**Kit di accoppiamento in profondità IP65** Per aumentare la profondità standard da 320 mm a 640 mm. Il kit è formato da: 2 fianchi, 1 chiusura superiore e 1 inferiore, 2 telai posteriori, viteria.	**833584**	**833585**	**833586**	**833587**	**833588**
	**Tetto** Necessario per un'efficace ventilazione (IP44) ottenuta praticando forature sul lato superiore del quadro. No necessario per il raggiungimento del grado di protezione IP65. In caso di dimensioni fuori standard contattateci.	**833566**	**833568**	**833566**	**833568**	**833570**
	**Base** per fissaggio a pavimento. Base e quadro sono ancorati in modo solidale al suolo. A = 65 mm	**833574**	↓ **833575**	**833574**	**833575**	**833576**
	**Adattatore per montaggio su base DIN** Il quadro e l 'adattatore vengono ancorati alla base DIN (in poliestere o conglomerato).	-	**833582**	-	**833582**	**833583**
	Base DIN	-	**842100**	-	**842100**	**842101**
 	**Telaio di montaggio in alluminio** Formato da 4 supporti e 2 montanti in profilato a C (per i profilati orizzontali vedere il capitolo 'accessori'), vedi G.43					
	Con regolazione continua	**833533**	**833533**	**833534**	**833534**	**833534**
	Con regolazione a passo di 12,5 mm	**833529**	**833529**	**833530**	**833530**	**833530**
	Lunghezza dei profili orizzontali (mm)	468	718	468	718	968

Accessori



Serrature con profilo semicilindrico

Standard: P = 40 mm - L = 30,5 mm

	832030	1
Con 2 chiavi V2432-E		
	832031	1
Con 2 chiavi 1242-E		
	832465	1
Con 2 chiavi 455-E		
	832466	1
Con 2 chiavi 405-E		
	843435	1
Con 1 chiave quadrata, 6 mm		
	832032	1
Con 1 chiave quadrata, 8 mm		
	832033	1
Con 1 chiave triangolare, 8 mm		
	832034	1
Con 1 chiave triangolare, 11 mm		
	832029	1
Con 1 chiave a doppia aletta, 3 mm		

Maniglia

	833629	1

Per serrature con profilo semicilindrico

(come ricambio)

Maniglia

	783148	1

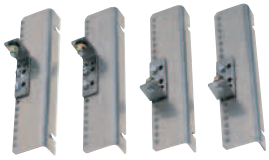
Per due serrature con profilo semicilindrico

Per aziende municipalizzate

Maniglia lucchettabile

	833630	1

Per lucchetto (max. Ø 10 mm)



Kit di regolazione profondità

	833528	1

Set di 4 squadrette per la regolazione della profondità di montaggio della piastra di montaggio (passo di 12,5mm)

Fermo porta/Fermo porta basculante

Angolo di apertura 100°

	833649	1

Sinistro

	833650	1

Destro

Squadrette di montaggio a parete per quadri standard

	833651	1

(come ricambio)

Kit di 4 squadrette (acciaio inox tipo 304) da fissare a scatto sul pannello posteriore.

Squadrette di montaggio a parete per quadri con tetto

	833624	1

Kit di 4 squadrette speciali da fissare a scatto sul pannello posteriore.

Tetti

Tetto per quadri accoppiati.

Per dimensioni standard vedi pag. G.40

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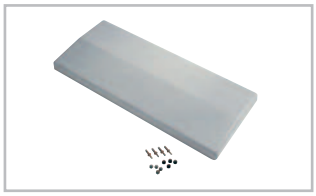


833656	1	1500 x 320 mm
833657	1	1750 x 320 mm
833658	1	2000 x 320 mm
833659	1	2250 x 320 mm
833660	1	2500 x 320 mm
833693	1	500 x 640 mm
833691	1	2000 x 640 mm
833692	1	750 x 640 mm
833783	1	1000 x 640 mm
833784	1	1250 x 640 mm

Accessori *(continua)*

Montaggio a palo

	833625	1

500 mm larghezza

	833626	1

750 mm larghezza

Montare i profili a C sul retro del quadro fissandoli sulle squadrette di fissaggio a parete. Posizionare il nastro metallico (non incluso) intorno al palo inserendolo nelle guide scorrevoli già inserite nel profilo a C. Fissare le guide e tendere il nastro.

Porta interna girevole IP20

A x L

500 x 500 mm	**833556**	1
500 x 750 mm	**833557**	1
750 x 500 mm	**833558**	1
750 x 750 mm	**833559**	1
1000 x 500 mm	**833561**	1
1000 x 750 mm	**833562**	1

Chiusura su due punti. Per applicazione nel settore del controllo e dell'automazione.

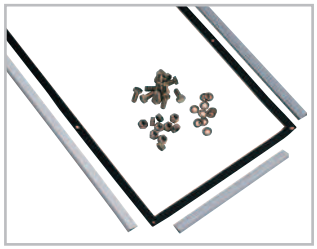
A/B	G	J
500	330	6
750	580	8
1000	830	12
1250	1080	14

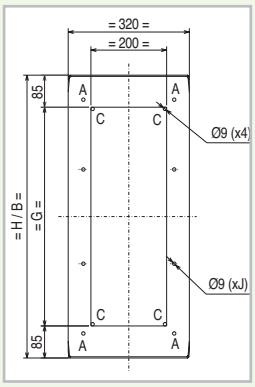
Kit di accoppiamento IP65

Profondità 320 mm

	833608	1
	833610	1
	833612	1
	833614	1

Accoppiamento verticale e/o orizzontale. La confezione comprende la guarnizione in neoprene, la viteria di accoppiamento e i profili di protezione.





Telaio girevole per rack 19"

Permette il fissaggio diretto di rack 19" o alle forature esistenti

	833680	1

Per quadri A x L = 500 x 750

6 unità 19" - 12 unità ETSI

	833681	1

Per quadri A x L = 750 x 750

12 unità 19" - 22 unità ETSI

	833682	1

Per quadri A x L = 1000 x 750

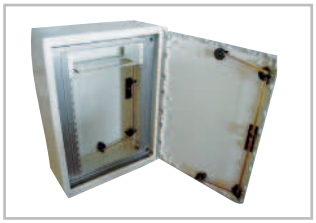
18 unità 19" - 32 unità ETSI

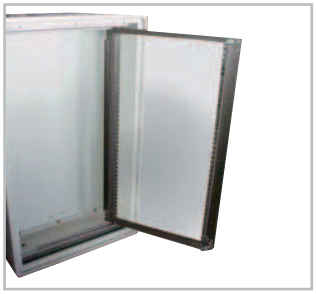
	833683	1

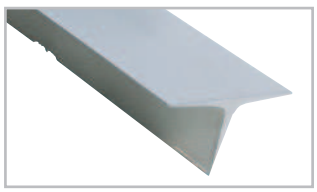
Per quadri A x L = 1250 x 750

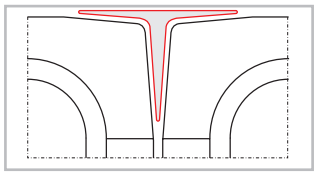
23 unità 19" - 42 unità ETSI

Telaio metallico: verniciatura epossidica RAL 7035 profilo 19" / ETSI metallo galvanizzato e bicromato









Profilo per angoli

	833653	1

Da inserire nello spazio formato tra gli spigoli di due quadri accoppiati.

Lunghezza = 308 mm

Utilizzare 2 profili quando vengono accoppiati 4 quadri.

Pannelli di chiusura per telaio girevole 19"/ETSI

Per coprire i rimanenti spazi liberi

	833684	1

Per quadri A x L = 500 x 750

Altezza pannello = 32 mm

	833685	1

Per quadri A x L = 750 x 750

Altezza pannello = 15 mm

	833686	1

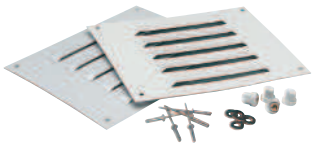
Per quadri A x L = 1250 x 750

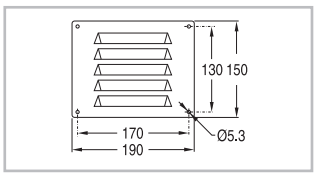
Altezza pannello = 28 mm

Metallo: verniciatura epossidica RAL 7035

A x L = 1000 x 750

Accessori (continua)



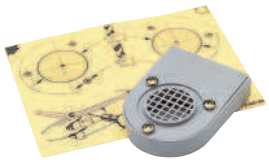


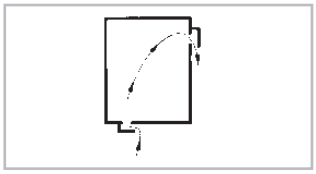
Griglia di ventilazione ⧈

	832019	1

Da montare su una apertura di ventilazione.

La confezione include 2 griglie da accoppiare, rivetti e dadi isolanti.





Aeratori IP44

Per garantire una sufficiente ventilazione e prevenire la formazione di condensa è necessario montare due aeratori per armadio. Si consiglia di montarne uno in basso e uno in alto.

	833677	1

Set di 2 pezzi in poliammide.

RAL 7035

Altre opzioni nell'apposito capitolo.

Struttura di supporto

Per PS220 e PS320

	891854	1

Per quadri per connessioni temporanee

Pannello di protezione

Si monta davanti alla piastra di montaggio o al telaio di montaggio

Pannello in PVC - RAL 7035 - 3 mm

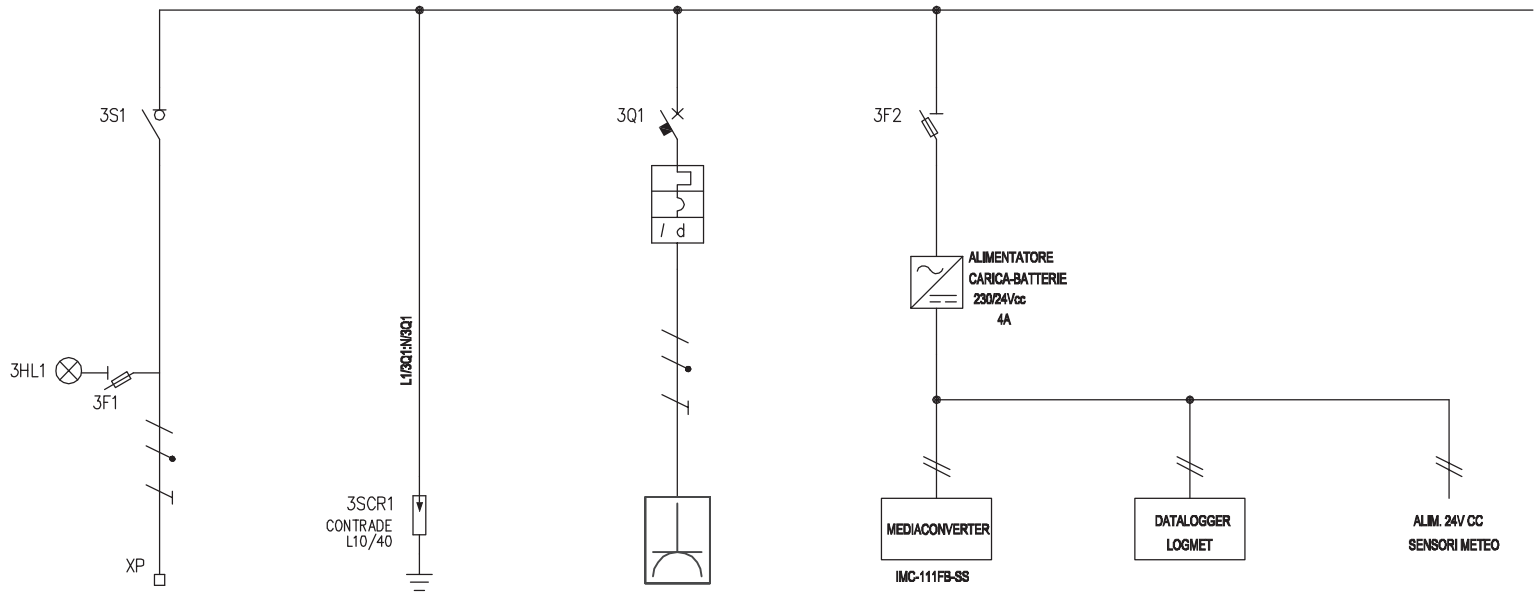
Per quadri (AxL)

500 x 500 mm	**833549**	1
750 x 500 mm	**833550**	1
750 x 750 mm	**833551**	1
1000 x 500 mm	**833648**	1
1000 x 750 mm	**833552**	1
1000x1000 mm	**833553**	1
1250 x 750 mm	**833554**	1
1250x1000 mm	**833555**	1

Pannello trasparente - 3 mm

Per quadri (AxL)

500 x 500 mm	**833640**	1
750 x 500 mm	**833641**	1
750 x 750 mm	**833642**	1
1000 x 500 mm	**833643**	1
1000 x 750 mm	**833644**	1
1000x1000 mm	**833645**	1
1250 x 750 mm	**833646**	1
1250x1000 mm	**833647**	1



UTENZA	DENOMINAZIONE			ALIMENTAZIONE DA QCA–CAB.INTERC.A9		LIMITATORI DI SOVRATENSIONI		PRESA DI SERVIZIO										
	SIGLA			3S1		SCR1		3Q1										
	TIPO	POTENZA TOT.	kW	TN–C	0,1				0.5									
	Ue V	Ib	A	230	0.5			230	2.2									
	COEF. CONTEMP.	COS í		1	0.9			1	0,9									
INTERRUTTORE O SEZIONATORE	COSTRUTTORE			G. SCHNEIDER				G. SCHNEIDER										
	TIPO			iSW				iC60N+VIGI										
	N.POLI	In	A	2	20			2	16									
	Ith A	Idn	A		/			16	0,03 (AC)									
	Im (o curva) A	Pdi	kA					160 (C)	10									
FUSIBILE	TIPO			STI (1P) – 10,3x38														
	CALIBRO		A	gG / 2														
CONTATTORE	TIPO																	
	In A	Pn	kW															
RELE' TERMICO	TIPO																	
	TARATURA		A															
LINEA DI POTENZA	TIPO CAVO			FG7(O)R														
	FORMAZIONE			3G4														
	LUNGHEZZA		m															
	Iz		A															
	C.d.T. a In %	C.d.T. a Ib	%															
	Zk mê	Zs	mê															
	Ik trifase/monof. kA	Ik1 fase/terra	kA															
	NUMERAZIONE MORSETTIERA			L1/3S1:N/3S1				L1/3Q1:N/3Q1:PE										

REV.	MODIFICA	DATA	RESP.

IMPIANTO
AUTOSTRADA PEDEMONTANA
TRATTA B1 – SVINCOLO DI LOMAZZO

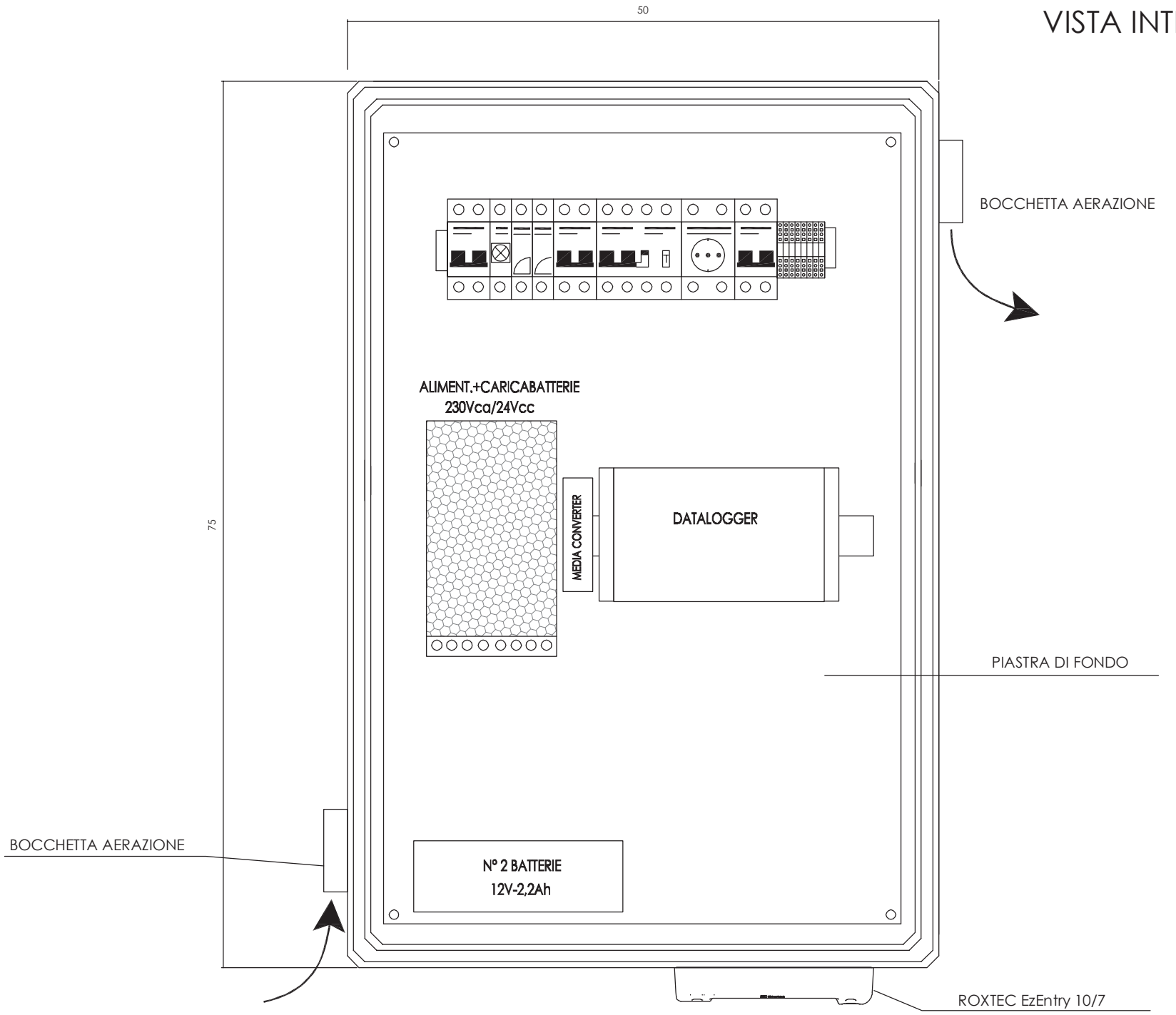
OGGETTO
CASSETTA STAZIONE METEO

DISEG.	S.T.
VERIF.	U.S.
APPR.	G.C.

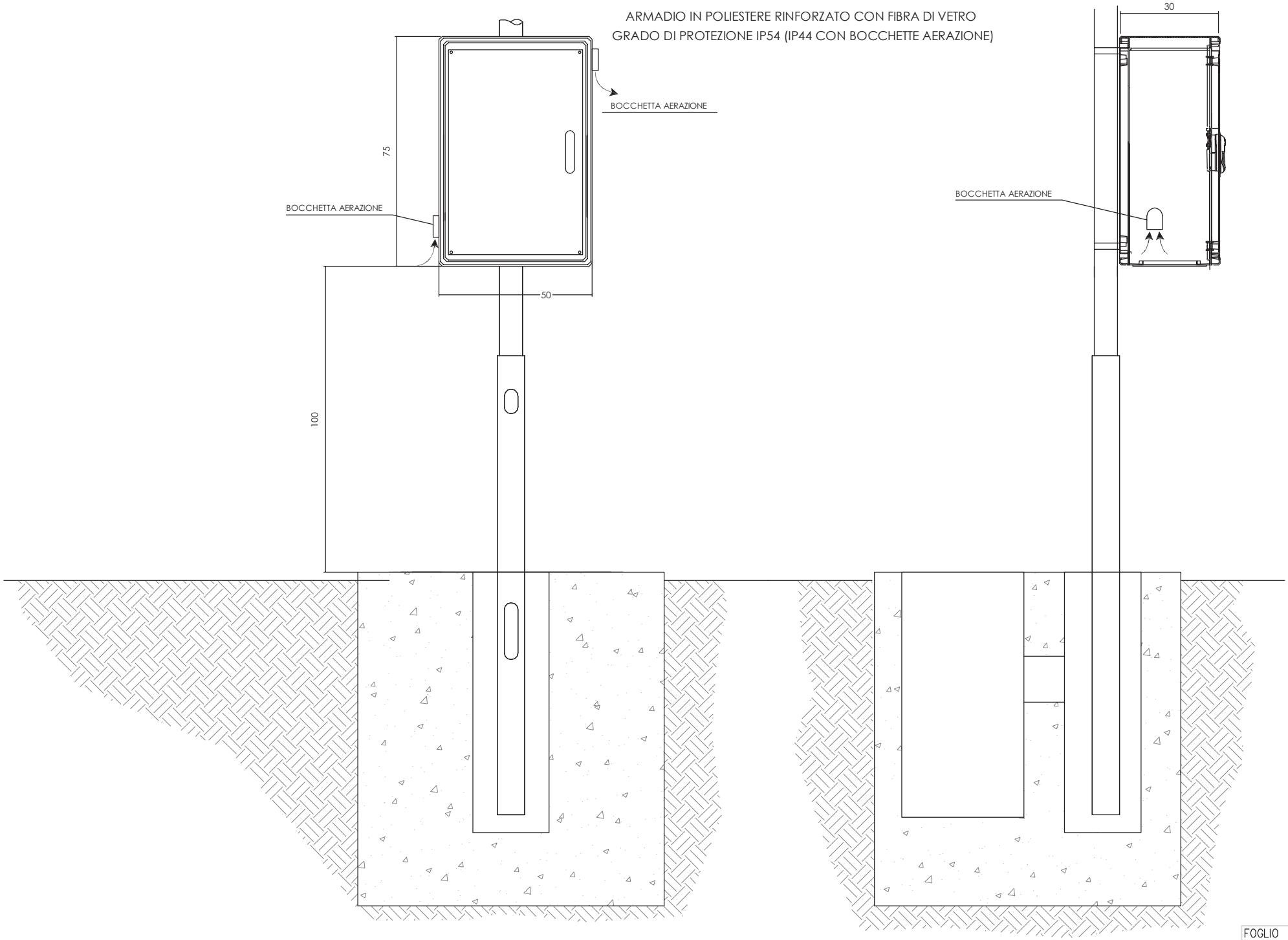
DISEGNO NR
01METEO/QE/13–050

FILE
FOGLIO 2 DI 4
SEGUE 3

VISTA INTERNA



ARMADIO IN POLIESTERE RINFORZATO CON FIBRA DI VETRO
GRADO DI PROTEZIONE IP54 (IP44 CON BOCCHETTE AERAZIONE)



PetrucciPali
urban light

Revisione		N. archivio	000737-14

Progetto		Offerta		Conferma d'ordine		N. ordine	
Data	12.11.2014	Agente commerciale	DINI				
Cliente	ELEF						
Cortese Attenzione							

Trasporto		€		Consegna	
Ind. sped.					
Pagamento					
Banca d'appoggio					

PALO DA ARREDO URBANO
DESCRIZIONE TECNICA

Codice PALO	***PRS.FS.320***	Ipotesi		Q.tà	
Altezza totale palo	mm 4000.00				
Interramento	mm 800.00				
Altezza punto luce					
Tronco inferiore	Ø 88.90 - H mm. 1500.00 (di cui mm 700.00 a vista)				
Tronco intermedio	Ø 76.00 - H mm. 1500.00				
Tronco superiore	Ø 60.00 - H mm. 1000.00				
Spessore	mm 3.20				
Asola superiore	Distanza dalla base del palo mm. **3150.00 (45 x 80)**				
Piastrina intermedia	Distanza dalla base del palo mm. **1350.00 (45 x 80)**				
Asola ingresso cavi	Distanza dalla base del palo mm. **600.00 (45 x 186)**				
Portella e morsettiera					
Accessori					

Codice MENSOLA	
Sporgenza	
Diametro	

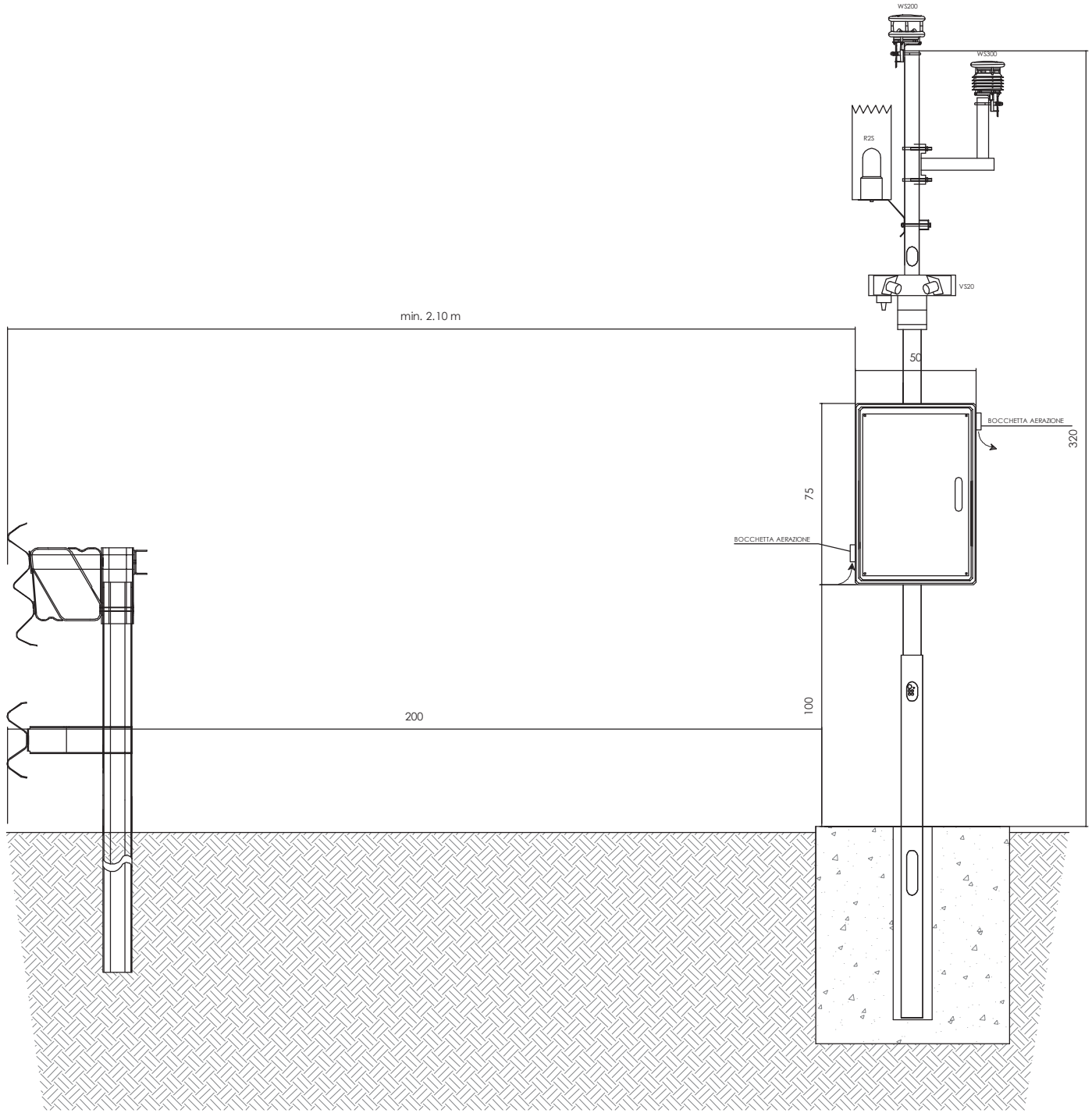
Verniciatura a polveri di poliestere	

CARATTERISTICHE TECNICHE
PALO RASTREMATO

ESECUZIONE	Palo ricavato da n. 3 tronchi cilindrici in acciaio saldati	
	circonferenzialmente	
MATERIALE	Acciaio S275 JR UNI EN 10219	
	Carico unitario di resistenza e trazione	R > 410 N/mm^2
	Carico unitario di snervamento	S ≥ 275 N/mm^2
	Allungamento	A ≥ 21%
TOLLERANZE	Diametro esterno alla base ± 1%	
	Spessore alla base ± 10%	
	Peso variabile in base alle tolleranze sul diametro e sullo spessore	
	Lunghezza totale ± 25 mm. per pali fino a 10000 mm., per altezze	
	superiore ± 0.6%	
	Rettilineità ± 0.3% sulla lunghezza totale	
PROTEZIONE	Zincatura a caldo per immersione a normativa EN ISO 1416	

Dimensioni espresse in mm.

S.P. Urbino - Tavoleto, 1 - 61020 - Tavoleto (PU) - ITALIA
Tel. 0722 62 91 17 - 0722 62 92 30 - fax 0722 62 91 15
www.petruccipali.it info@petruccipali.it
cciaa Pesaro N° 93984 • Reg. Soc. Trib. Urbino N° 1751 • Part. IVA a C.F. 00887000412


WS200
WS300
R2S
VS20
min. 2.10 m
50
BOCCHETTA AERAZIONE
320
75
BOCCHETTA AERAZIONE
100
200

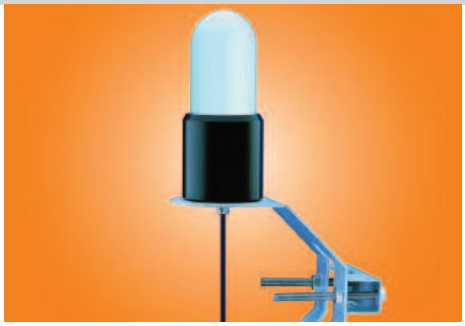
Il pacchetto A consiste di:

Stazione meteo compatta WS 300

Stazione meteo compatta, nuova di fabbrica

Temperatura, umidità relativa, pressione atmosferica,
8372.U01
ca. 150mmx225 mm; ca. 1,2 kg
Temperatura –50….+60°C (+/- 0,2°C)
Umidità 0…..100% (+/- 2%)
Pressione atmosferica 300….1200 hPa (+/- 0,5 hPa)

Sensore R2S - Precipitazione



Quantità e tipologia di precipitazione, con schermatura 8367.U01 (incl. 8367.SCHIRM)

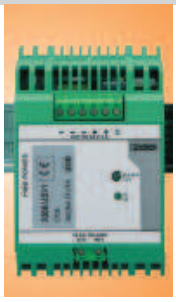
Tipologia precipitazione: pioggia, neve, grandine, nevischio, pioggia gelata.
Dimensione gocce: 0,3….5mm
Risoluzione precipitazione liquida: 0,01…0,1….1,0 mm/m
Temperatura di lavoro –30°C…..+70°C

Sensore Visibilità VS20 - UMB

8366.U50
ca. 360mm x 180mm x 80mm, ca. 4 kg.

Campo di misurazione 10….2000 m
Margine errore10% del valore misurato
Segnale d'uscita 4….20mA
Interfaccia RS485 Half-Duplex
Ventilazione inclusa
Calibrazione sensore tramite porta RS485
Temperatura di lavoro –40°C…..+60°C

Alimentatore 24V/4A



2938837

Datalogger


Foto indicativa

Memoria 64 MB on board SDRam e sistema operativo Linux
Ingressi analogici 8
Ingressi digitali 8 optoisolati
Uscite digitali 8 optoisolate
Connettività Quad-Band-Modem GSM/GPRS/GPS
Display esterno
Porte di collegamento:
2 x USB (host) 1 x USB device)
1 x RS 232
1 x RS 485 / RS 422
1 x Ethernet 10/100 Mbps
Temperatura operativa -30°C ..+70°C
Alimentazione 7 .50 VDC

Preconfigurazione stazione meteo

- Allestimento, montaggio e collegamento di tutte le parti su apposite barre DIN
- Cassetta di protezione messa a disposizione dal cliente (le dimensioni vengono fornite da noi)
- Test di corretto funzionamento
- Il lavoro viene eseguito presso la ns. officina a Vipiteno

Il pacchetto B consiste di:

Stazione meteo compatta WS 300

Stazione meteo compatta, nuova di fabbrica

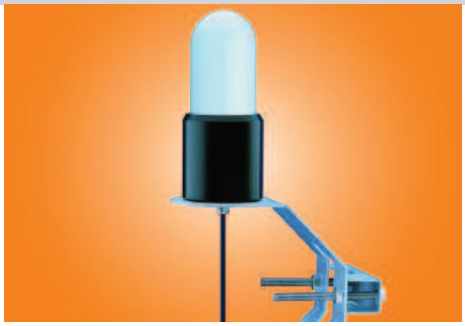
Temperatura, umidità relativa, pressione atmosferica,
8372.U01
ca. 150mmx225 mm; ca. 1,2 kg
Temperatura –50….+60°C (+/- 0,2°C)
Umidità 0…..100% (+/- 2%)
Pressione atmosferica 300….1200 hPa (+/- 0,5 hPa)

Stazione meteo compatta WS 200

Stazione meteo compatta, nuova di fabbrica
8371.UO1

Direzione del vento
Principio ad ultrasuoni
Campo di misurazione 0…359,9°
Margine errore 3°
Velocità del vento
Principio ad ultrasuoni
Campo di misurazione 0…75m/s
Margine errore 0,3 m/s o 3% (0…35 m/s)

Sensore R2S - Precipitazione



Quantità e tipologia di precipitazione, con schermatura 8367.U01

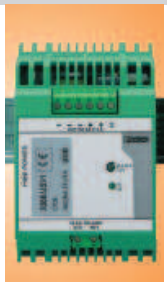
Tipologia precipitazione: pioggia, neve, grandine, nevischio, pioggia gelata.
Dimensione gocce: 0,3….5mm
Risoluzione precipitazione liquida: 0,01…0,1….1,0 mm/m
Temperatura di lavoro –30°C…..+70°C

Sensore Visibilità VS20 - UMB

8366.U50
ca. 360mm x 180mm x 80mm, ca. 4 kg.

Campo di misurazione 10….2000 m
Margine errore10% del valore misurato
Segnale d'uscita 4….20mA
Interfaccia RS485 Half-Duplex
Ventilazione inclusa
Calibrazione sensore tramite porta RS485
Temperatura di lavoro –40°C…..+60°C

Alimentatore 24V/4A



2938837

Datalogger


Foto indicativa

Memoria 64 MB on board SDRam e sistema operativo Linux
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Ingressi digitali 8 optoisolati
Uscite digitali 8 optoisolate
Connettività Quad-Band-Modem GSM/GPRS/GPS
Display esterno
Porte di collegamento:
2 x USB (host) 1 x USB device)
1 x RS 232
1 x RS 485 / RS 422
1 x Ethernet 10/100 Mbps
Temperatura operativa -30°C⋯..+70°C
Alimentazione 7⋯.50 VDC

Preconfigurazione stazione meteo

- Allestimento, montaggio e collegamento di tutte le parti su apposite barre DIN
- Cassetta di protezione messa a disposizione dal cliente (le dimensioni vengono fornite da noi)
- Test di corretto funzionamento
- Il lavoro viene eseguito presso la ns. officina a Vipiteno

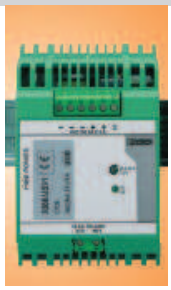
Il pacchetto C consiste di:

Stazione meteo compatta WS 200

Stazione meteo compatta, nuova di fabbrica
8371.UO1

Direzione del vento
Principio ad ultrasuoni
Campo di misurazione 0…359,9°
Margine errore 3°
Velocità del vento
Principio ad ultrasuoni
Campo di misurazione 0…75m/s
Margine errore 0,3 m/s o 3% (0…35 m/s)

Alimentatore 24V/4A



2938837

Datalogger


Foto indicativa

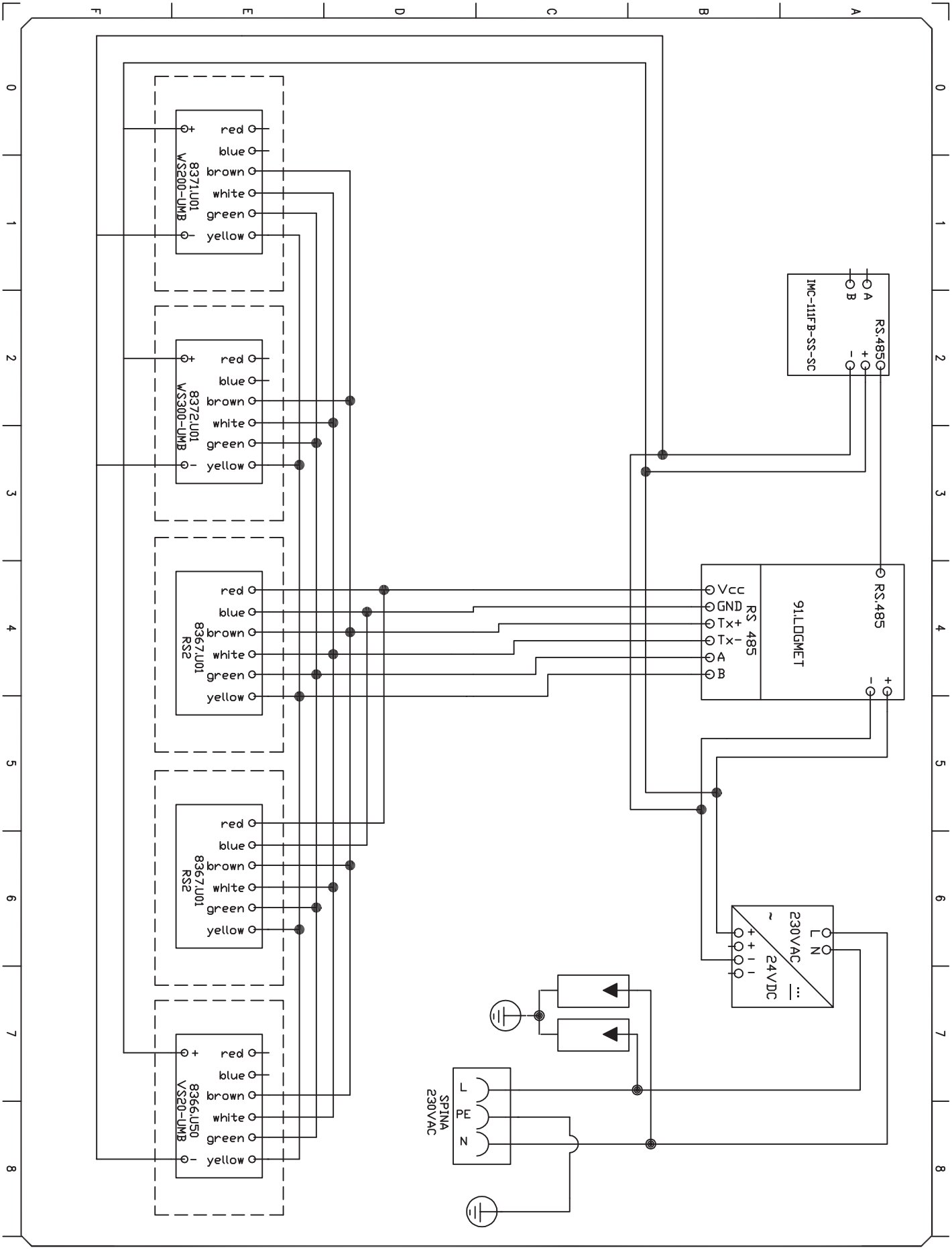
Memoria 64 MB on board SDRam e sistema operativo Linux
Ingressi analogici 8
Ingressi digitali 8 optoisolati
Uscite digitali 8 optoisolate
Connettività Quad-Band-Modem GSM/GPRS/GPS
Display esterno
Porte di collegamento:
2 x USB (host) 1 x USB device)
1 x RS 232
1 x RS 485 / RS 422
1 x Ethernet 10/100 Mbps
Temperatura operativa -30°C⋯..+70°C
Alimentazione 7⋯.50 VDC

Preconfigurazione stazione meteo

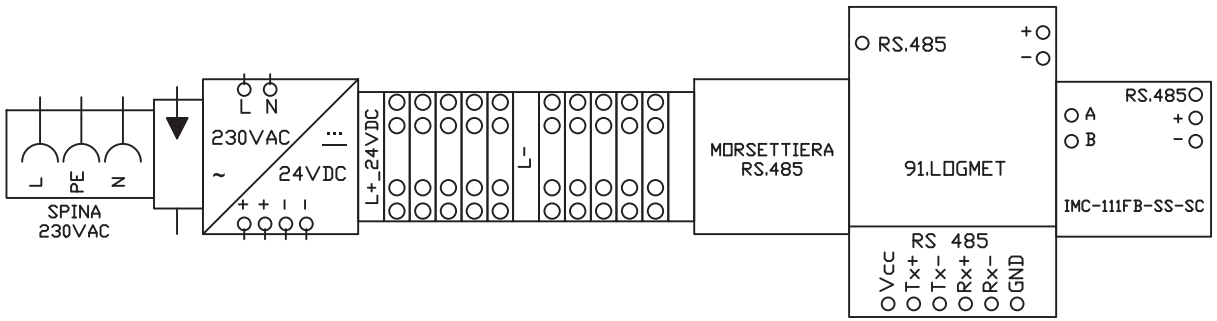
- Allestimento, montaggio e collegamento di tutte le parti su apposite barre DIN
- Cassetta di protezione messa a disposizione dal cliente (le dimensioni vengono fornite da noi)
- Test di corretto funzionamento
- Il lavoro viene eseguito presso la ns. officina a Vipiteno

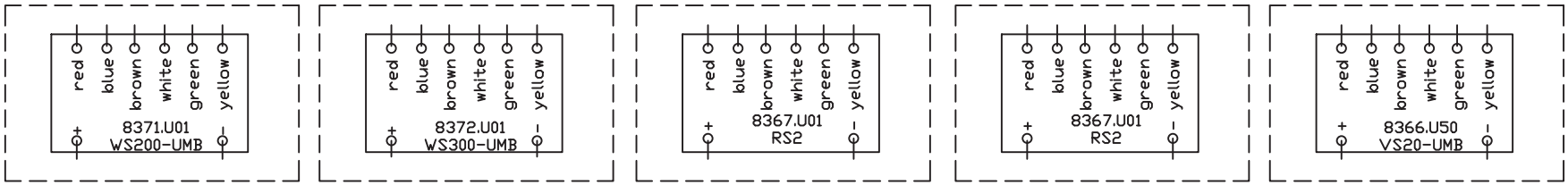
Messa in servizio

- Verifica della corretta installazione
- Assistenza alla messa in servizio con test di funzionamento locale sulla stazione meteo
- Conteggio a consuntivo
- Canone giornaliero



Intercom - Dr. Leitner Srl con socio unico
Zona Produttiva Reifenstein 21
I-39040 Campo di Trens
T:0472 765 512 F:0472 766 749
intercom@leitner.it - www.leitner.it





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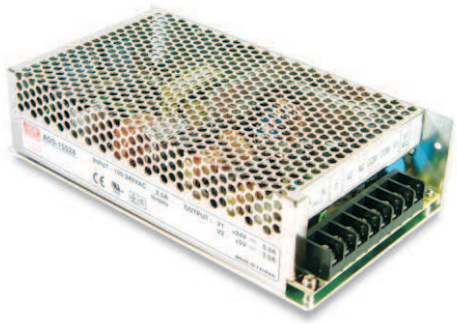
intercom@leitner.it - www.leitner.it

LOGMET
TIPOGRAFI

155W Single Output with Battery Charger(UPS Function) AD-155 series



■ Features :

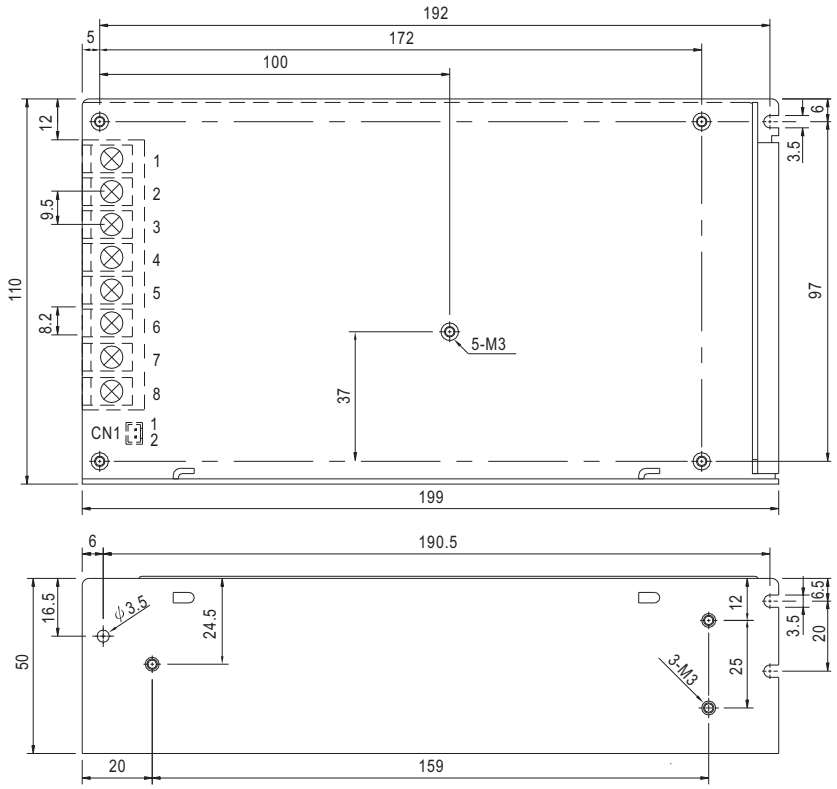
- Universal AC input / Full range
- Protections: Short circuit / Overload / Over voltage
- Battery low and battery polarity protection
- Cooling by free air convection
- 100% full load burn-in test
- Fixed switching frequency at PFC 67KHz, PWM 134KHz
- 2 years warranty

SPECIFICATION

MODEL		AD-155A		AD-155B		AD-155C	
OUTPUT	OUTPUT NUMBER	CH1	CH2	CH1	CH2	CH1	CH2
	DC VOLTAGE	13.8V	13.3V	27.6V	27.1V	54V	53.5V
	RATED CURRENT	10.5A	0.5A	5A	0.5A	2.7A	0.2A
	CURRENT RANGE	0 ~ 11.5A	0 ~ 0.5A	0 ~ 5.5A	0 ~ 0.5A	0 ~ 2.7A	0 ~ 0.5A
	RATED POWER	151.55W		151.55W		156.5W	
	RIPPLE & NOISE (max.) Note.2	150mVp-p	--------	150mVp-p	--------	240mVp-p	--------
	VOLTAGE ADJ. RANGE	CH1: 12 ~ 14.5V		CH1: 24 ~ 29V		CH1: 48 ~ 58V	
	VOLTAGE TOLERANCE Note.3	±2.0%	--------	±1.0%	--------	±1.0%	--------
	LINE REGULATION	±0.5%	--------	±0.5%	--------	±0.5%	--------
	LOAD REGULATION	±0.5%	--------	±0.5%	--------	±0.5%	--------
	SETUP, RISE TIME	1000ms, 90ms/230VAC 2000ms, 90ms/115VAC at full load					
	HOLD UP TIME (Typ.)	24ms/230VAC 20ms/115VAC at full load					
INPUT	VOLTAGE RANGE	88 ~ 264VAC 124 ~ 370VDC					
	FREQUENCY RANGE	47 ~ 63Hz					
	POWER FACTOR (Typ.)	PF>0.92 at full load					
	EFFICIENCY (Typ.)	80%		84%		84%	
	AC CURRENT (Typ.)	2.5A/115VAC 1.5A/230VAC					
	INRUSH CURRENT (Typ.)	COLD START 20A/115VAC 40A/230VAC					
	LEAKAGE CURRENT	<1mA / 240VAC					
PROTECTION	OVERLOAD	CH1:105 ~ 135% CH2:0.51 ~ 0.9A rated output power					
		Protection type : AC Charging Mode : Constant current limiting, recovers automatically after fault condition is removed UPS Mode : Protected by internal fuse					
	OVER VOLTAGE	CH1:15.87 ~ 18.63V		CH1:31.74 ~ 37.26V		CH1:62.1 ~ 72.9V	
		Protection type : Shut down o/p voltage, re-power on to recover					
	BATTERY LOW	10V±0.8V		19.5V(+1.5V,-1V)		39V±2V	
ENVIRONMENT	WORKING TEMP.	-10 ~ +60℃ (Refer to "Derating Curve")					
	WORKING HUMIDITY	20 ~ 90% RH non-condensing					
	STORAGE TEMP., HUMIDITY	-20 ~ +85℃, 10 ~ 95% RH					
	TEMP. COEFFICIENT	±0.03%/℃ (0 ~ 50℃)					
	VIBRATION	10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes					
SAFETY & EMC (Note 4)	SAFETY STANDARDS	UL60950-1, TUV EN60950-1 approved					
	WITHSTAND VOLTAGE	I/P-O/P:3KVAC I/P-FG:1.5KVAC O/P-FG:0.5KVAC					
	ISOLATION RESISTANCE	I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH					
	EMC EMISSION	Compliance to EN55022 (CISPR22) Class B, EN61000-3-2,-3					
	EMC IMMUNITY	Compliance to EN61000-4-2,3,4,5,6,8,11, EN55024, light industry level, criteria A					
OTHERS	MTBF	183.3K hrs min. MIL-HDBK-217F (25℃)					
	DIMENSION	199*110*50mm (L*W*H)					
	PACKING	0.88Kg; 16pcs/15Kg/0.95CUFT					
NOTE	1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25℃ of ambient temperature. 2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uf & 47uf parallel capacitor. 3. Tolerance : includes set up tolerance, line regulation and load regulation. 4. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives. For guidance on how to perform these EMC tests, please refer to "EMI testing of component power supplies." (as available on http://www.meanwell.com)						

■ Mechanical Specification

Case No. 906B Unit:mm



Terminal Pin No. Assignment

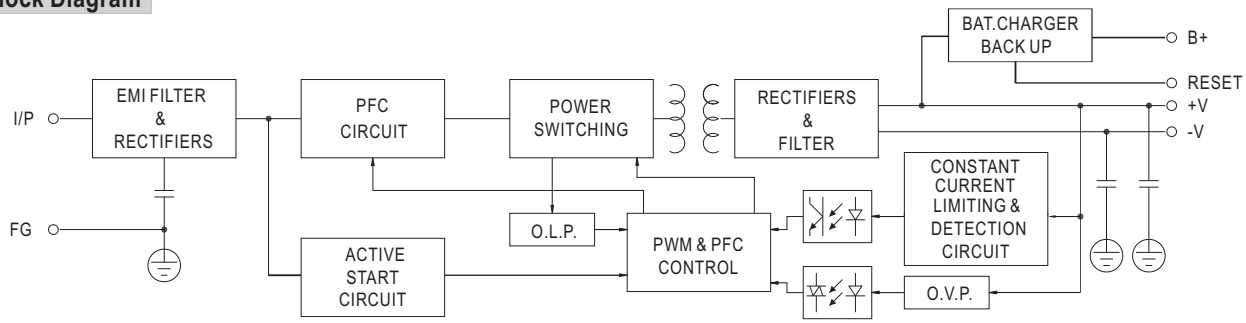
Pin No.	Assignment	Pin No.	Assignment
1	AC/L	5	BAT. +
2	AC/N	6	BAT. -/COM
3	FG ⏚	7	DC OUTPUT COM
4	NC	8	DC OUTPUT +V

CN1 Pin No. Assignment :JST B2B-XH or equivalent

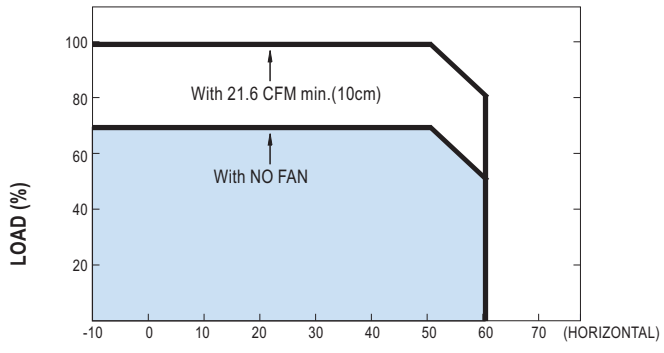
Pin No.	Assignment	Mating Housing	Terminal
1	RESET SW	JST XHP or equivalent	JST SXH-001T-P0.6 or equivalent
2			

PFC fosc : 67KHz
PWM fosc : 134KHz

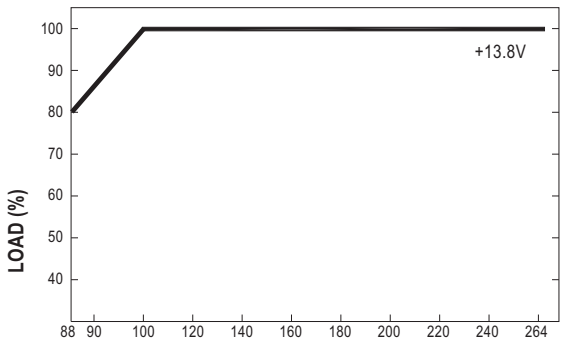
■ Block Diagram



■ Derating Curve



■ Output Derating VS Input Voltage (A)



Operating Manual English

Compact Weather Station

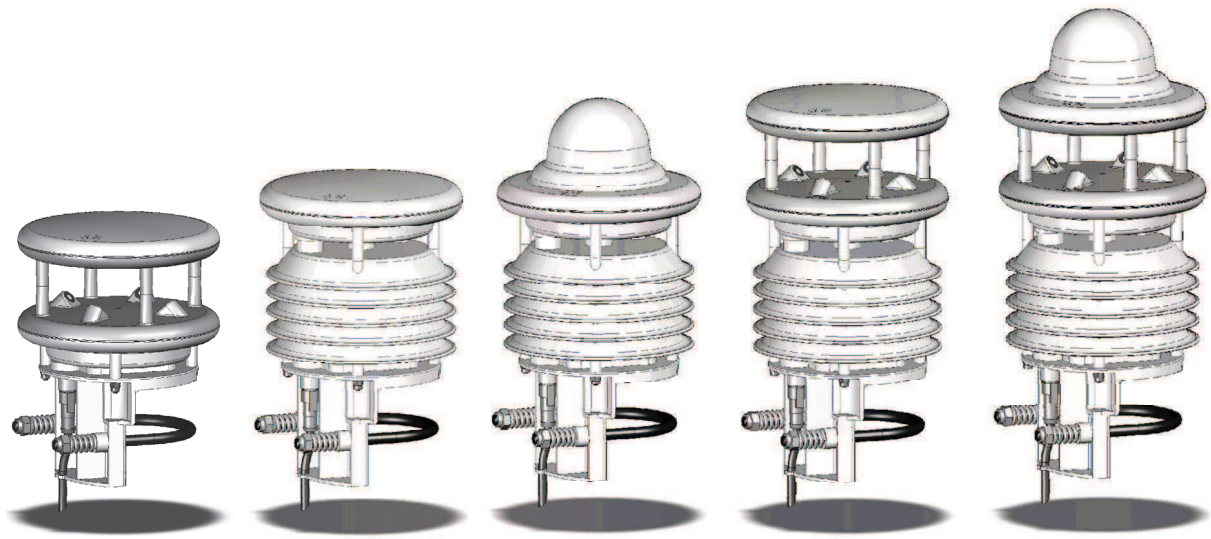
WS200-UMB

WS300-UMB ←

WS400-UMB

WS500-UMB

WS600-UMB



CE UMB

www.lufft.com Lufft

Contents

1 Please Read Before Use

1.1 Symbols Used

Important information concerning potential hazards to the user

Important information concerning the correct operation of the equipment

1.2 Safety Instructions

- Installation and commissioning must be carried out by suitably qualified specialist personnel only.
- Never take measurements on or touch live electrical parts.
- Pay attention to the technical data and storage and operating conditions.

1.3 Designated Use

- The equipment must only be operated within the range of the specified technical data.
- The equipment must only be used under the conditions and for the purposes for which it was designed.
- The safety and operation of the equipment can no longer be guaranteed if it is modified or adapted.

1.4 Incorrect Use

If the equipment is installed incorrectly

- It may not function.
- It may be permanently damaged.
- Danger of injury may exist if the equipment is allowed to fall.

If the equipment is not connected correctly

- It may not function.
- It may be permanently damaged.
- The possibility of an electrical shock may exist.

1.5 Guarantee

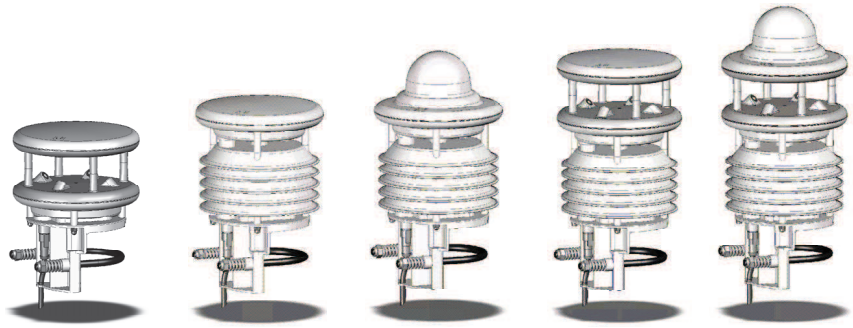
The guarantee period is 12 months from the date of delivery. The guarantee is forfeited if the designated use is violated.

1.6 Brand Names

All brand names referred to are subject without limitation to the valid trademark and ownership rights of the respective owner.

2 Scope of Delivery

- Equipment



WS200-UMB WS300-UMB WS400-UMB WS500-UMB WS600-UMB

- Connection cable 10m

- Operating manual

3 Order Numbers

WS200-UMB **8371.U01**

- Wind direction
- Wind speed

WS300-UMB **8372.U01**

- Air temperature
- Relative humidity
- Air pressure

WS400-UMB **8369.U01** (Europe, USA, Canada)

- Precipitation **8369.U02** (UK)
- Air temperature
- Relative humidity
- Air pressure

WS500-UMB **8373.U01**

- Wind direction
- Wind speed
- Air temperature
- Relative humidity
- Air pressure

WS600-UMB **8370.U01** (Europe, USA, Canada)

- Precipitation **8370.U02** (UK)
- Wind direction
- Wind speed
- Air temperature
- Relative humidity
- Air pressure

3.1 Accessories

Power supply unit 24V/100VA	8366.USV1
ISOCON-UMB	8160.UISO
Surge protection	8379.USP

3.2 Spare Parts

Connection cable 10m	On enquiry

3.3 Additional Documents and Software

You can download the following documents and software via the Internet at www.lufft.com.

Operating Manual	• This document
UMB-Config-Tool	• Windows® software for testing, firmware updates and configuration of UMB devices
UMB Protocol	• Communications protocol for UMB devices
Firmware	• The current device firmware

4 Equipment Description

The WS family is a range of low cost, compact weather stations for the acquisition of a variety of measurement variables, as used for example for environmental data logging in road traffic management systems. Depending on the model, each device has a different combination of sensors for the various measurement variables.

	WS200-UMB	WS300-UMB	WS400-UMB	WS500-UMB	WS600-UMB
Air temperature		●	●	●	●
Relative humidity		●	●	●	●
Air pressure		●	●	●	●
Precipitation			●		●
Wind direction	●			●	●
Wind speed	●			●	●

Attention: Please note that, due to the approval of the radar sensor used, there are different country options on equipment which includes precipitation measurement.

The equipment is connected by way of an 8 pole screw connector and associated connection cable (length 10m).

The measured values are requested over the RS485 interface in accordance with UMB protocol.

During commissioning, configuration and measurement polling takes place using the UMB-Config-Tool (Windows® PC software).

4.1 Air Temperature and Relative Humidity

Temperature is measured by way of a highly accurate NTC-resistor while humidity is measured using a capacitive humidity sensor. In order to keep the effects of external influences (e.g. solar radiation) as low as possible, these sensors are located in a ventilated housing with radiation protection. In contrast to conventional non-ventilated sensors, this allows significantly more accurate measurement during high radiation conditions.

Additional variables such as dewpoint, absolute humidity and mixing ratio are calculated from air temperature and relative humidity, taking account of air pressure.

4.2 Air Pressure

Absolute air pressure is measured by way of a built-in sensor (MEMS). The relative air pressure referenced to sea level is calculated using the barometric formula with the aid of the local altitude, which is user-configurable on the equipment.

4.3 Precipitation

Tried and tested radar technology from the R2S-UMB sensor is used to measure precipitation. The precipitation sensor works with a 24GHz Doppler radar, which measures the drop speed and calculates precipitation quantity and type by correlating drop size and speed.

4.4 Wind

The wind meter uses 4 ultrasound sensors which take cyclical measurements in all directions. The resulting wind speed and direction are calculated from the measured run-time sound differential.

4.5 Heating

The precipitation sensor and wind meter are heated for operation in winter.

Note: the heating is designed for ambient temperatures down to -10°C, below -10°C the function can not be ensured under all conditions.

4.6 Sensor Technology (example: WS600-UMB)

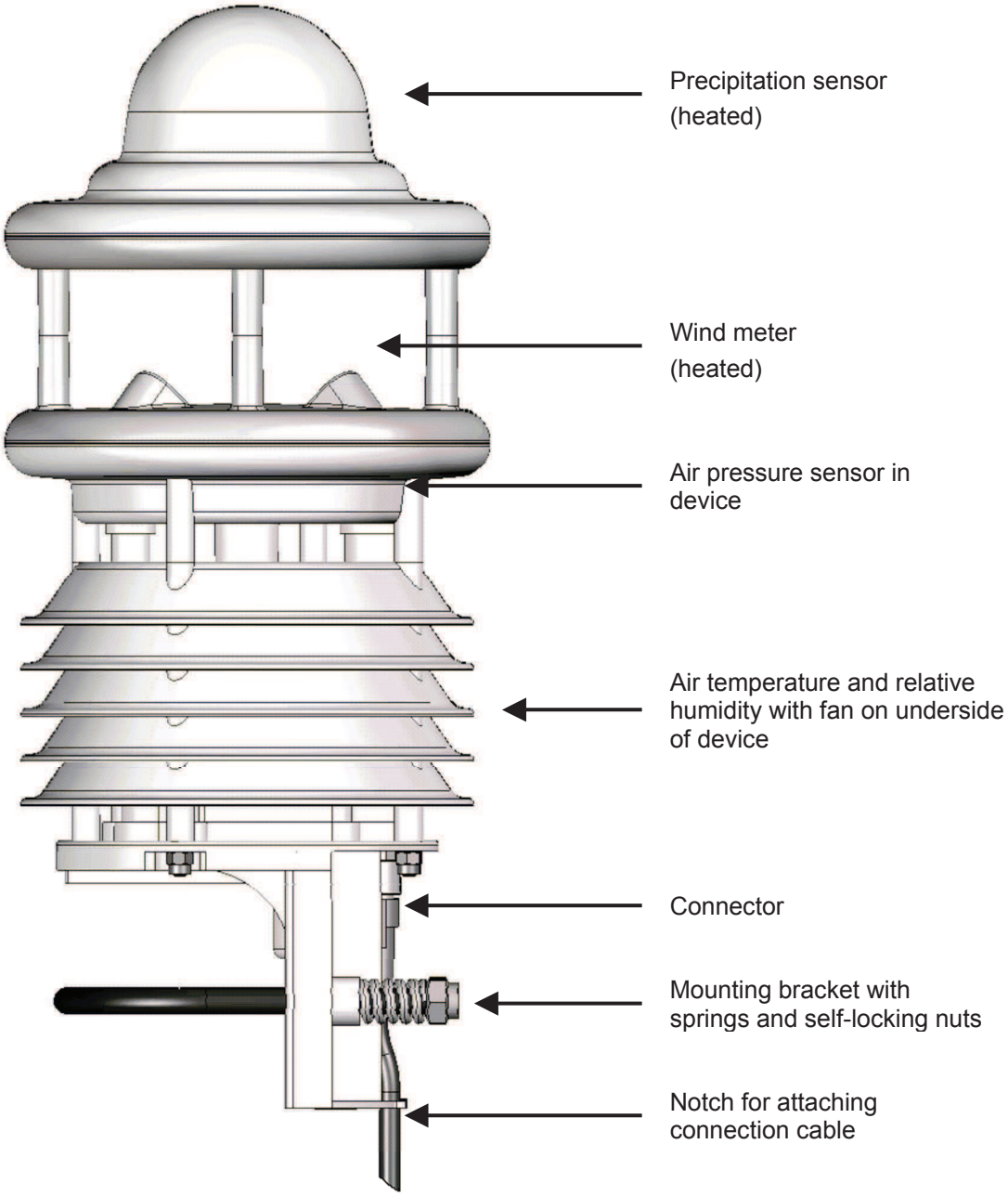


Figure 1: Sensor Technology

5 Generation of Measurements

5.1 Current Measurement (act)

In accordance with the specified sampling rate, the value of the last measurement is transmitted when the current measurement value is requested. Each measurement is stored in a circular buffer for the subsequent calculation of minimum, maximum and average values.

5.2 Minimum and Maximum Values (min and max)

When requesting the minimum and maximum values, the corresponding value is calculated - via the circular buffer at the interval (1 – 10 minutes) specified in the configuration - and transmitted.

Note: In the case of wind direction, the minimum / maximum value indicates the direction at which the minimum / maximum wind speed was measured.

5.3 Average Value (avg)

When requesting the average value, this is calculated - via the circular buffer at the interval (1 – 10 minutes) specified in the configuration - and transmitted. In this way moving averages can also be calculated.

5.4 Vectorial Average Value (vct)

In the specific case of wind measurement, measurements are calculated vectorially. To this end, the average values of the vectors are generated internally. Hence the value (wind speed) and angle (wind direction) of the vector are calculated.

Note: On delivery, the interval for the calculation of minimum, maximum and average values is set at 10 minutes. If necessary, this can be adjusted to the particular requirements (1 – 10 minutes) with the aid of the UMB-Config-Tool (see page 22).

6 Measurement Output

Measurements are transmitted in accordance with UMB binary protocol (Factory Settings).

You can find an example of a measurement request in different protocols and a complete summary of the list of channels in the Appendix.

6.1 Air and Dewpoint Temperature

Sampling rate 1 minute

Generation of average value 1 – 10 minutes

Units °C; °F

Request channels:

UMB Channel					Measuring Range		
act	min	max	avg	Measurement Variable	min	max	unit
100	120	140	160	Air temperature	-40.0	60.0	°C
105	125	145	165	Air temperature	-40.0	140.0	°F
110	130	150	170	Dewpoint temperature	-40.0	60.0	°C
115	135	155	175	Dewpoint temperature	-40.0	140.0	°F

6.2 Wind Chill Temperature

Sampling rate 1 minute, computed on base of the average temperature and wind speed

Units °C; °F

Request channels:

UMB Channel					Measuring Range		
act	min	max	avg	Measurement Variable	min	max	unit
111				Wind chill temperature	-60,0	70,0	°C
116				Wind chill temperature	-76,0	158,0	°F

6.3 Relative Humidity

Sampling rate 1 minute

Generation of average value 1 – 10 minutes

Units %RH; g/m³; g/kg

Request channels:

UMB Channel					Measuring Range		
act	min	max	avg	Measurement Variable	min	max	unit
200	220	240	260	Relative humidity	0.0	100.0	%
205	225	245	265	Absolute humidity	0.0	1000.0	g/m³
210	230	250	270	Mixing ratio	0.0	1000.0	g/kg

6.4 Air Pressure

Sampling rate 1 minute

Generation of average value 1 – 10 minutes

Unit hPa

Request channels:

UMB Channel					Measuring Range		
act	min	max	avg	Measurement Variable	min	max	unit
300	320	340	360	Absolute air pressure	300	1200	hPa
305	325	345	365	Relative air pressure	300	1200	hPa

Note: For the correct calculation of relative air pressure, the altitude of the location must be entered in the device configuration (see Figure 11 on page 24). The factory setting for altitude is 0m; in this way both measurement variables deliver the same values.

6.5 Wind Speed

Sampling rate	10 seconds
Generation of average value	1 – 10 minutes
Generation of maximum value	1 – 10 minutes based on the internal second measurements
Units	m/s; km/h; mph; kts
Response threshold	0.3 m/s

Request channels:

UMB Channel						Measuring Range		
act	min	max	avg	vct	Measurement Variable	min	max	unit
400	420	440	460	480	Wind Speed	0	60.0	m/s
405	425	445	465	485	Wind Speed	0	216.0	km/h
410	430	450	470	490	Wind Speed	0	134.2	mph
415	435	455	475	495	Wind Speed	0	116.6	kts

Note: The internal sampling rate is 1 second. The second measurements are averaged over 10 seconds for the output of the current measurement.

6.6 Wind Direction

Sampling rate	10 seconds
Generation of average value	1 – 10 minutes
Generation of maximum value	1 – 10 minutes based on the internal second measurements
Unit	°
Response threshold	0.3 m/s

Request channels:

UMB Channel						Measuring Range		
act	min	max	avg	vct	Measurement Variable	min	max	unit
500	520	540		580	Wind Direction	0	359.9	°

Note: The internal sampling rate is 1 second. The second measurements are averaged over 10 seconds for the output of the current measurement.

The minimum / maximum wind direction indicates the direction at which the minimum / maximum wind speed was measured.

6.7 Precipitation Quantity - Absolute

Sampling rate Event-dependent on reaching the response threshold

Response threshold 0.01mm

Units l/m²; mm; in; mil

Request channels:

UMB Channel	Measurement Variable	Unit
600	Precipitation Quantity - Absolute	l/m²
620	Precipitation Quantity - Absolute	mm
640	Precipitation Quantity - Absolute	in
660	Precipitation Quantity - Absolute	mil

Note: This measurement indicates the accumulated precipitation quantity since the last device reboot. The measurement is retained for the duration of a short power failure (up to 15 minutes). To reset this value, use the corresponding function in the UMB-Config-Tool (see page 25) or disconnect the device from the power supply for at least one hour.

6.8 Precipitation Quantity - Differential

Sampling rate Event-dependent on reaching the response threshold

Response threshold 0.01mm

Units l/m²; mm; in; mil

Request channels:

UMB Chanel	Measurement Variable	Unit
605	Precipitation Quantity - Differential	l/m²
625	Precipitation Quantity - Differential	mm
645	Precipitation Quantity - Differential	in
665	Precipitation Quantity - Differential	mil

Note: Each request from a differential channel sets the accumulated quantity back to zero. If the response from the device is lost due to a transmission error (e.g. poor GPRS connection), the quantity accumulated to date is also lost. The quantity accumulated to date is also reset each time the equipment is rebooted.

6.9 Precipitation Intensity

Sampling rate 1 minute

Response threshold 0.6 mm/h

Units l/m²/h; mm/h; in/h; mil/h

Request channels:

UMB Channel	Measurement Variable	Unit
800	Precipitation Intensity	l/m²/h
820	Precipitation Intensity	mm/h
840	Precipitation Intensity	in/h
860	Precipitation Intensity	mil/h

Note: The precipitation intensity is always calculated on the basis of the precipitation intensity of the previous minute.

6.10 Precipitation Type

Sampling rate Event-dependent on reaching the response threshold

Response threshold 0.01mm

Follow-up time 2 minutes

Request channels:

UMB Channel	Measurement Variable	Coding
700	Precipitation Type	0 = No precipitation 60 = Liquid precipitation, e.g. rain 70 = Solid precipitation, e.g. snow

Note: A detected precipitation type remains valid for 2 minutes after the end of the precipitation event. In order to record precipitation types which only occur for a short period (e.g. short-term rain), the request time should be at least 1 minute.

Ice and sleet are transmitted as rain (60); hail is transmitted as solid precipitation (70).

7 Installation

The sensor bracket is designed to be installed on the top of a mast with a diameter of 60 – 76mm.

The following tools are required for the installation:

- Open-end or ring spanner (SW13)
- Compass for aligning the wind meter to the North

7.1 Fastening

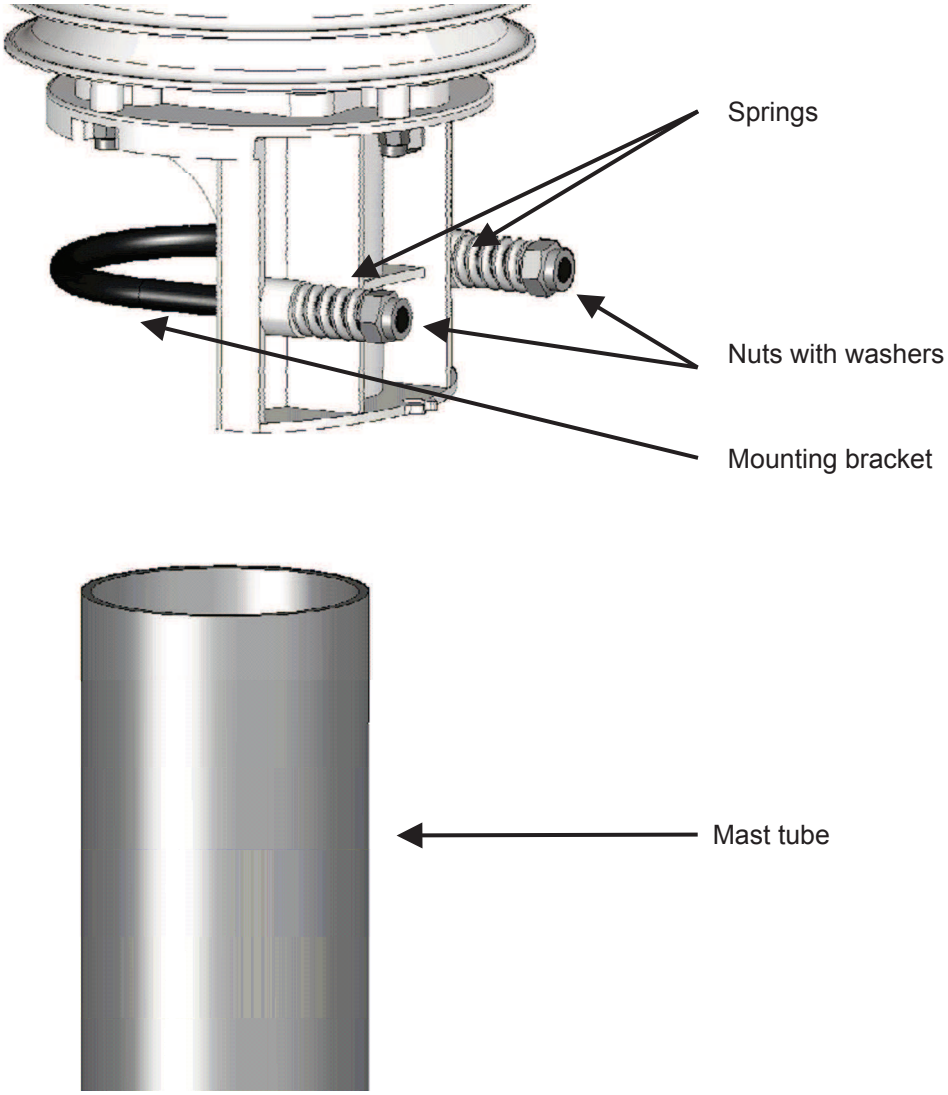


Figure 2: Fastening to the Mast

- Loosen nuts
- Push the sensor onto the top of the mast from above
- Tighten the nuts evenly until contact is made with the springs but the sensor can still be moved easily
- Align the sensor to the North (for wind meters)
- Tighten both nuts with **3 revolutions**

7.2 North Alignment

In order for the wind direction to display correctly, the sensor must be aligned to the North. The sensor has a number of directional arrows for this purpose.

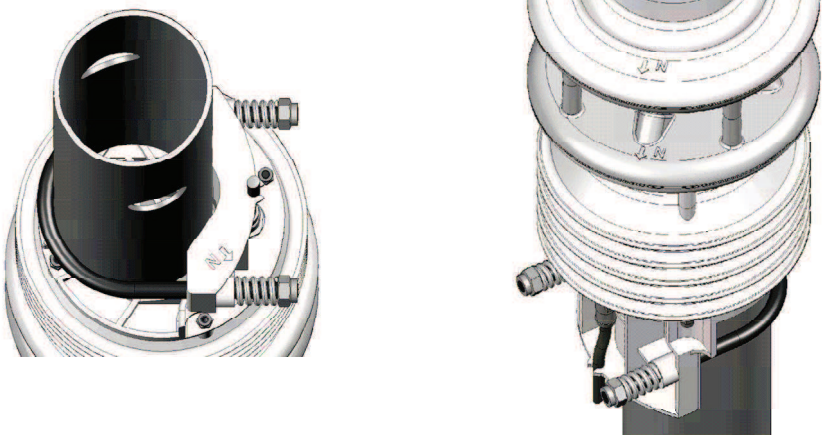


Figure 3: North Markings

Procedure:

- If the sensor is already installed, first loosen both nuts evenly until you can turn the sensor easily
- Using the compass, identify the North and fix a point of reference on the horizon
- Position the sensor in such a way that the South and North sensors are in alignment with the fixed point of reference in the North
- Tighten both nuts with 3 revolutions

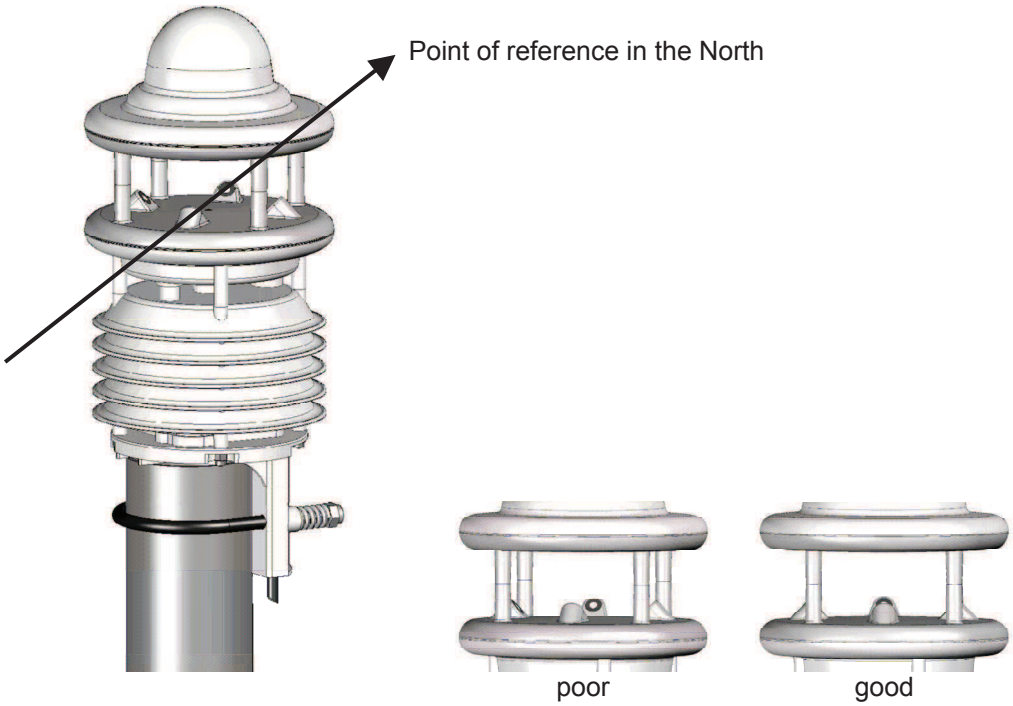


Figure 4: Alignment to North

Note: As the magnetic North Pole indicated by the compass differs from the Geographic North Pole, account must be taken of the declination (variation) at the location when aligning the sensor.

Depending on the location, the variation can be more than 15° (in North America for example). In Central Europe the variation can be largely ignored at present (< 3°). You can find further helpful information on this subject on the Internet.

7.3 Selecting the Installation Location

In order to guarantee long service life and correct equipment operation, please pay attention to the following points when selecting the installation location.

7.3.1 General Instructions

- Stable subsurface for installing the mast
- Free access to the equipment for maintenance works
- Reliable power supply for permanent operation
- Good network coverage when transmitting over a mobile communications network

Note: The computed measurements specifically apply to the equipment location only. No conclusions can be drawn with regard to the wider environment or a complete road section.

ATTENTION:

- Only approved and tested appliances (conductors, risers etc.) should be used to install the device on the mast.
- All relevant regulations for working at this height must be observed.
- The mast must be sized and anchored appropriately.
- The mast must be earthed in accordance with regulations.
- The corresponding safety regulations for working at road side and in the vicinity of the road carriageway must be observed.

If the equipment is installed incorrectly

- It may not function.
- It may be permanently damaged.
- Danger of injury may exist if the equipment is allowed to fall.

7.3.2 Sensors with Wind Measurement

- Installation at the top of the mast
- Installation height at least 2m above the ground
- Free field around the sensor

Note: Buildings, bridges, embankments and trees may corrupt the wind measurement. Equally, passing traffic may cause gusts which may influence the wind measurement.

7.3.3 Sensors with Precipitation Measurement

- Installation on the top of the mast
- Installation height at least 4.5m above the ground
- Distance to road carriageway at least 10m
- Distance from moving objects (e.g. trees, bushes and even bridges) at least 10m at the height of the sensor

Note: Falling or moving objects, e.g. falling leaves or leaves blowing in the wind, may cause false measurements and/or precipitation types.

Note: Strong wind can influence the accuracy of the precipitation measurement.

Note: When selecting the installation location please take care to position the device at a suitable distance from other systems incorporating a 24GHz radar sensor, such as traffic counting devices on overhead gantry signs. Otherwise cross effects and system malfunctions may occur. In the final analysis, the distance to other measuring systems also depends on their range of coverage and signal strength.

7.3.4 Installation Sketch

Example WS600-UMB:

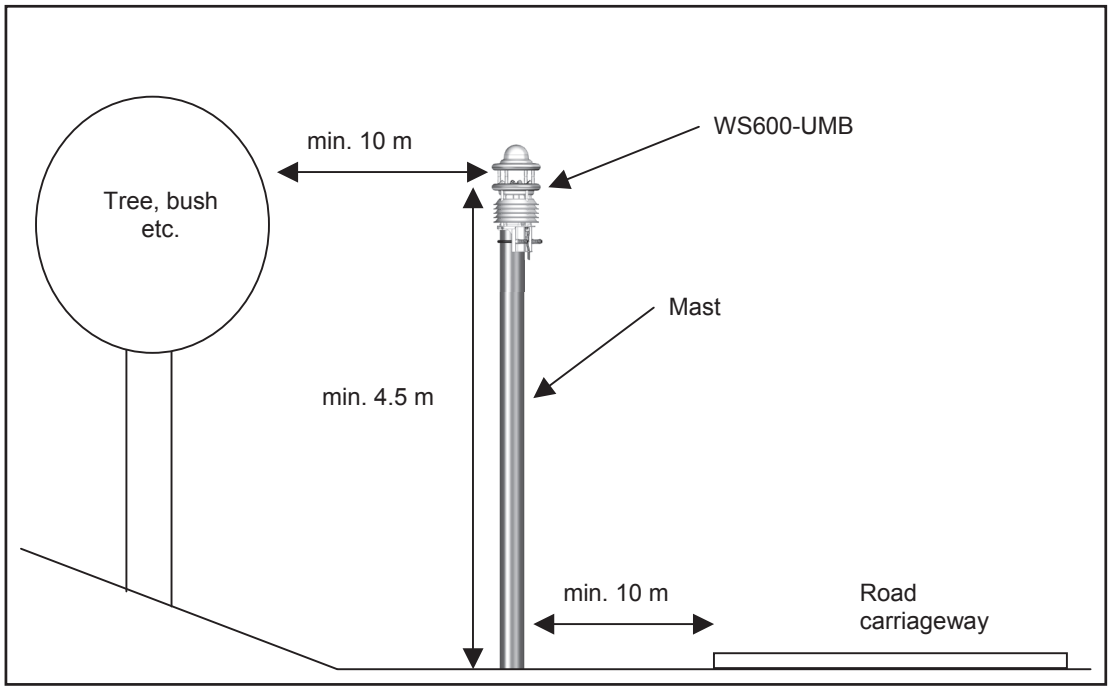
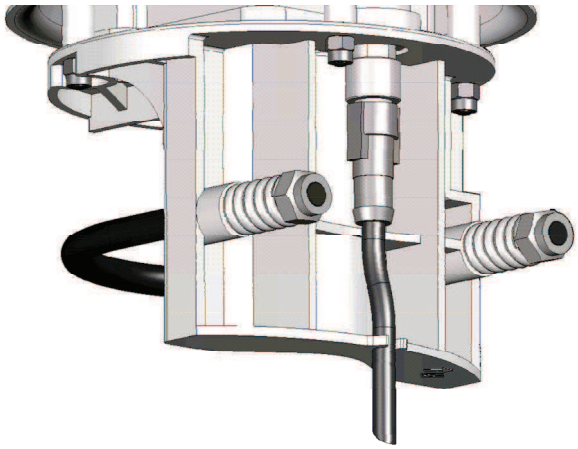


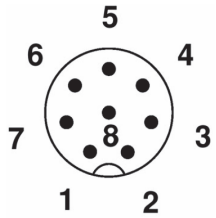
Figure 5: Installation Sketch

8 Connections

There is an 8 pole screw connector on the underside of the equipment. This serves to connect the supply voltage and interfaces by way of the supplied connection cable.

Equipment connector:





View on sensor connection

Figure 6: Connections

Pin assignment:

1	White	Supply voltage ground
2	Brown	Positive supply voltage
3	Green	RS485_A
4	Yellow	RS485_B
5	Gray	Not assigned
6	Pink	Not assigned
7	Blue	Heating voltage ground
8	Red	Positive heating voltage

The cable marking is in accordance with DIN 47100.

Note: The yellow protective cap must be removed before plugging in the equipment.

If the equipment is not connected correctly

- It may not function
- It may be permanently damaged
- The possibility of an electrical shock may exist

8.1 Supply Voltage

The supply voltage for the compact weather station is 12 - 24V DC. The power supply unit used must be approved for operation with equipment of protection class III (SELV).

Note: A heating voltage of 24V DC is recommended to guarantee full heating duty. If the heating is operated on 12V DC, account must be taken of the functional restrictions in winter operation.

8.2 RS485 Interface

The equipment has an electrically isolated, half-duplex, 2 wire RS485 interface for configuration, measurement polling and the firmware update.

See page 30 for technical details.

8.3 Connection to ISOCON-UMB (8160.UISO)

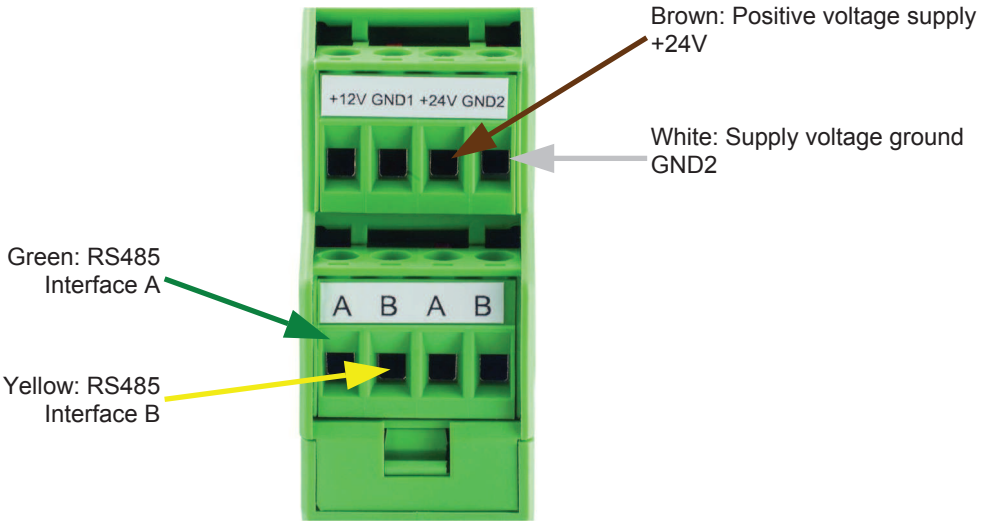


Figure 7: Connection to ISOCON-UMB

Warning: The heating voltage (red = positive heating voltage; blue = heating voltage ground) is **not** connected to the ISOCON-UMB but wired direct to the power supply unit. During installation please also refer to the operating manual for the ISOCON-UMB.

8.4 Use of Surge Protection (8379.USP)

When using surge protection (Order No.: 8379.USP), please pay attention to the connection example in the surge protection operating instructions.

9 Commissioning

After the equipment has been installed and connected correctly, the sensor begins autonomously to take measurements. A Windows® PC with serial interface, UMB-Config-Tool software and interface cable (SUB-D 9 pole; jack - socket; 1:1) are required for configuration and test purposes.

Attention must be paid to the following points:

- Check for correct equipment operation on site by carrying out a measurement request with the aid of the UMB-Config-Tool (see page 26).
- Configure the local altitude in order to ensure the correct calculation of relative air pressure (see page 24).
- The device must be aligned to the North in order to ensure correct wind measurement (see page 16).
- If several compact weather stations are operated on a UMB network, a unique device ID must be assigned to each device (see page 23).

There is no protective cover to remove on the sensor itself.

10 Configuration and Test

Lufft provides Windows® PC software (UMB-Config-Tool) for configuration purposes. The sensor can also be tested and the firmware updated with the aid of this software.

10.1 Factory Settings

The compact weather station is delivered with the following settings:

Class ID:	7 (cannot be modified)
Device ID:	1 (gives address 7001h = 28673d)
Baud rate:	19200
RS485 protocol:	Binary
Calculation interval:	10 measurements
Local altitude:	0 m

Note: The device ID must be changed if several compact weather stations are operated on a UMB network, as each device requires a unique ID. It makes sense to start from ID 1 and continue in ascending order.

10.2 Configuration with the UMB-Config-Tool

The operation of the UMB-Config-Tool is described in detail in the operating instructions for the Windows® PC software. For this reason only the menus and functions specific to the compact weather station are described here.

10.2.1 Sensor Selection

The compact weather station is shown here with sensor selection WSx-UMB (Class ID 7).

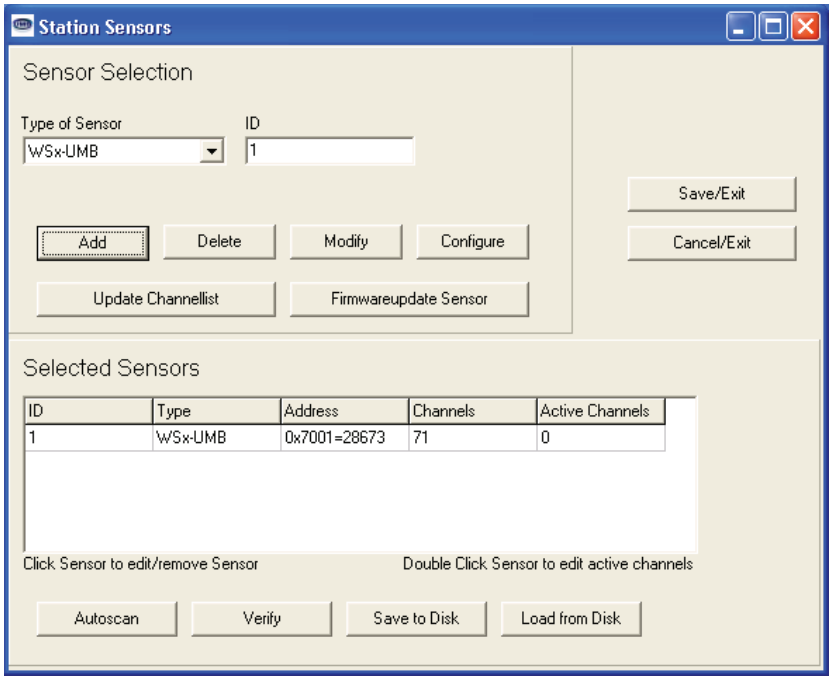


Figure 8: Sensor Selection

Note: If the UMB-Config-Tool does not recognize the WSx-UMB sensor type, select the number '7' under 'Sensor Type'. With the compact weather station connected, click on 'Update Channel List'. You can then request measurements in order to test the sensor.

However, you do require the current version of the UMB-Config-Tool to configure the compact weather station.

Note: All other devices which are used in the polling process, e.g. modems, LCOM etc., must be disconnected from the UMB network during configuration.

10.2.2 Configuration

After a configuration has been loaded, all relevant settings and values can be adjusted. Depending on the device type, only the settings pertinent to the respective available sensors are relevant.

10.2.3 General Settings

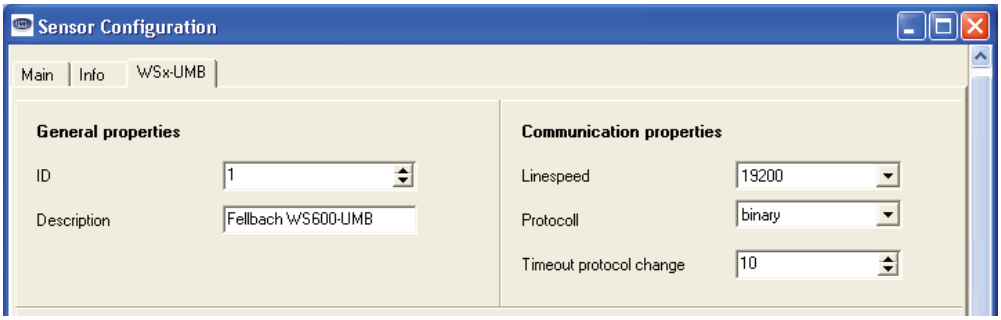


Figure 9: General Settings

ID: Device ID (factory setting 1; assign device IDs to additional devices in ascending order).

Description: In order to differentiate the devices you can enter a description here, e.g. the location.

Linespeed: Transmission speed of the RS485 interface (factory setting 19200; DO NOT CHANGE for operation with ISOCON-UMB).

Protocol: Communications protocol of the sensor (Binär, ASCII oder Terminal).

Timeout: In the event of a temporary changeover of the communications protocol, the system switches back to the configured protocol after this time (in minutes) (no function at present).

10.2.4 Temperature and Humidity Settings

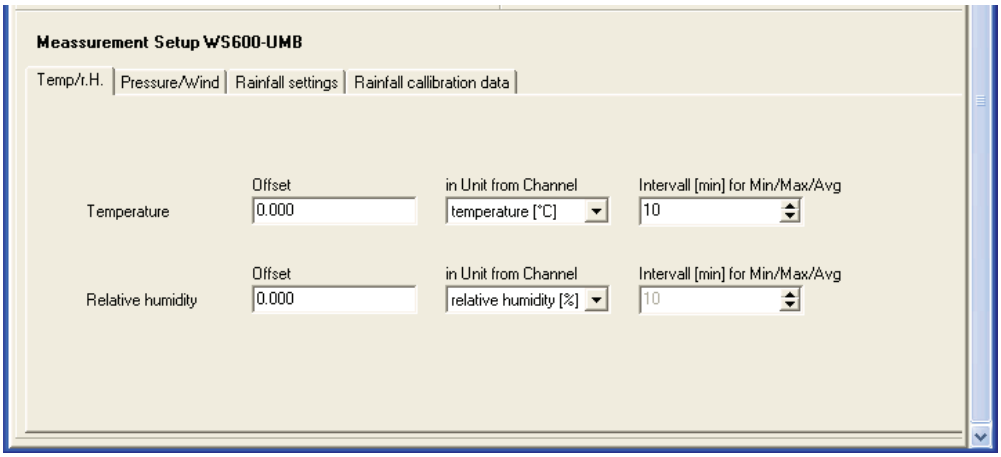


Figure 10 Temperature and Humidity Settings

Offset: Absolute offset on the measurement in the unit of the accompanying channel (for on site calibration).

Interval: Time in minutes for the minimum, maximum and average value calculation interval.

Note: In order to calculate dewpoint, absolute humidity and mixing ratio, the temperature and humidity measurement always requires the same interval. For this reason different intervals can not be set.

10.2.5 Pressure and Wind Settings

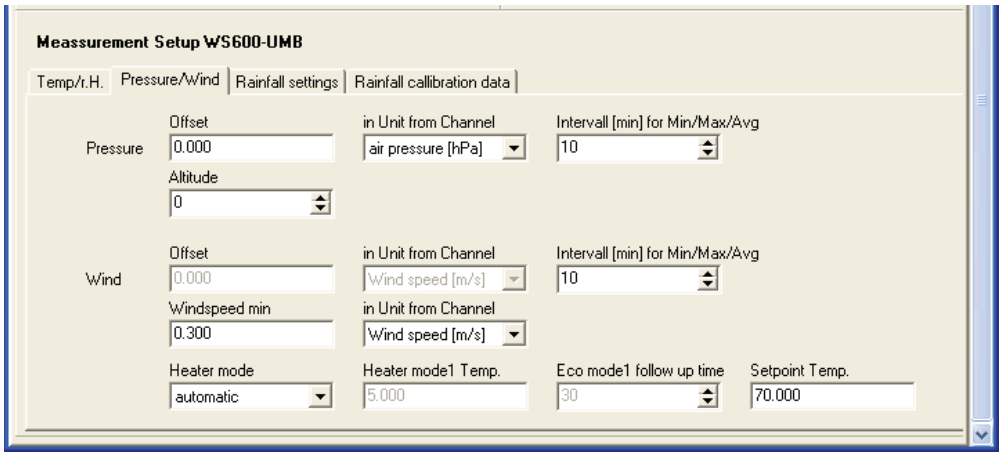


Figure 11 Pressure and Wind Settings

Offset: Absolute offset on the measurement in the unit of the accompanying channel.

Interval: Time in minutes for the minimum, maximum and average value calculation interval.

Altitude: Enter the local altitude in meters here for the correct calculation of relative air pressure (referenced to sea level).

Windspeed min: Approach velocity onto the wind meter with effect from which a measurement is transmitted, in the unit of the accompanying channel.

Heater mode: The device can be configured for heating in different operating modes. Configure as ‘automatic’ in normal operating mode. You can find a precise description of the operating modes on page 27.

Note: The offset is not used for the wind meter at present because on-site calibration is not possible in this case.

10.2.6 Rain Gauge Settings

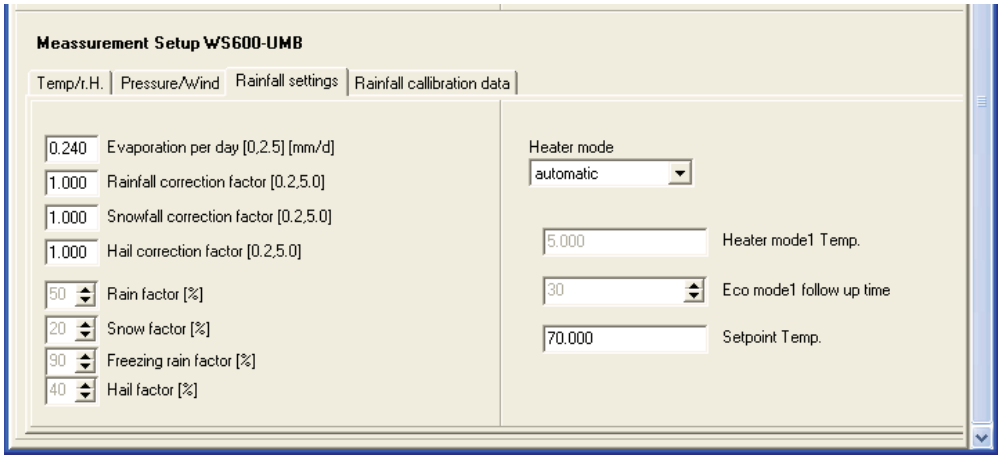


Figure 12 Rain Gauge Settings

Heater mode: The device can be configured for heating in different operating modes. Configure as ‘automatic’ in normal operating mode. You can find a precise description of the operating modes on page 27.

Note: All other parameters, especially those in the ‘Rainfall calibration data’ tab, may only be changed after consultation with the manufacturer, as they have a major influence on the functioning and accuracy of the sensor.

10.2.7 Reset Precipitation Quantity

To reset the accumulated absolute precipitation quantity the UMB-Config-Tool offers the following function:

Options → WSxUMB reset rain

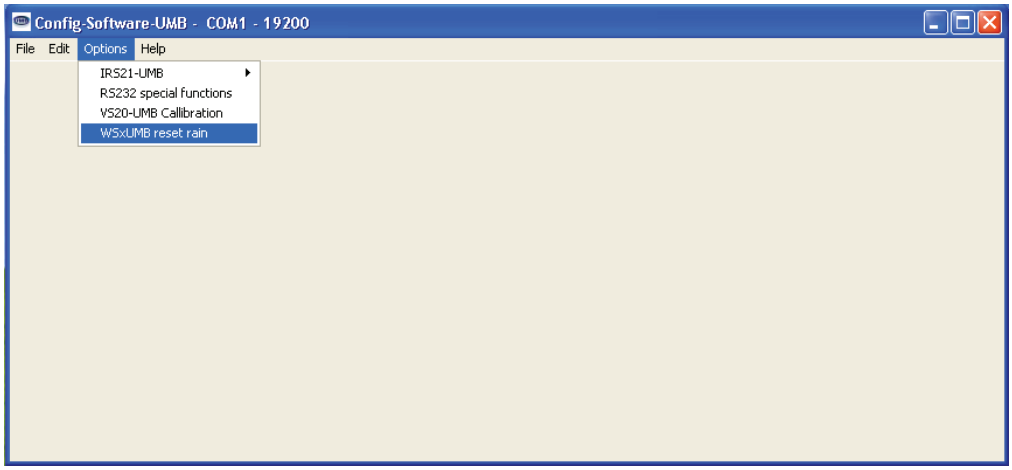
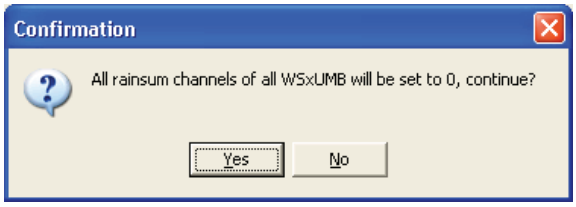


Figure 13: Reset Precipitation Quantity

Confirm the reset with 'Yes'



Note: The precipitation quantities are reset in ALL compact weather stations on the respective UMB network. The device reboots after this function has been reset.

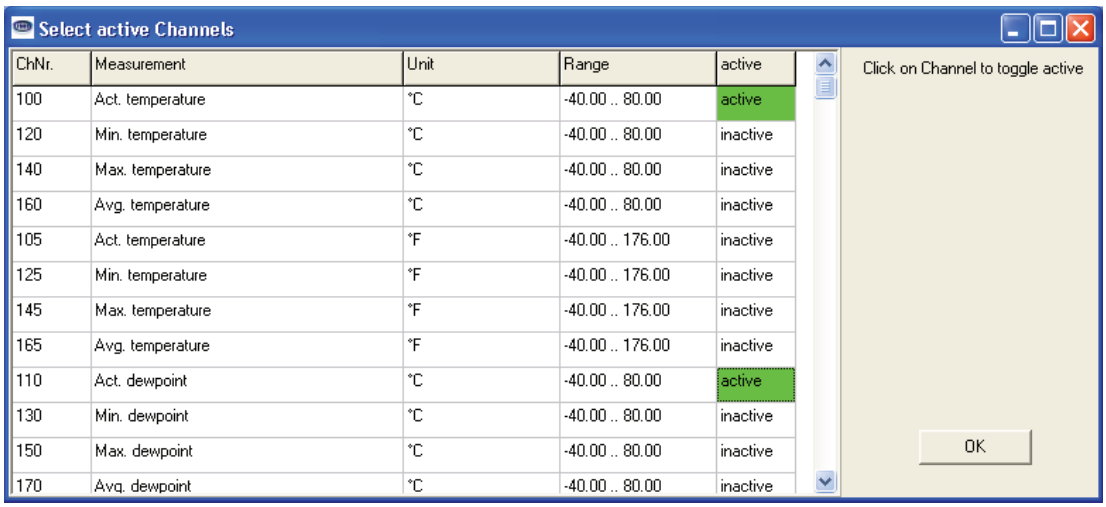
10.3 Function Test with UMB-Config-Tool

The functions of the compact weather station can be tested with the UMB-Config-Tool by polling various channels.

Note: All other devices which are used in the polling process, e.g. modems, LCOM etc., must be disconnected from the UMB network during configuration.

10.3.1 Channels for Measurement Polling

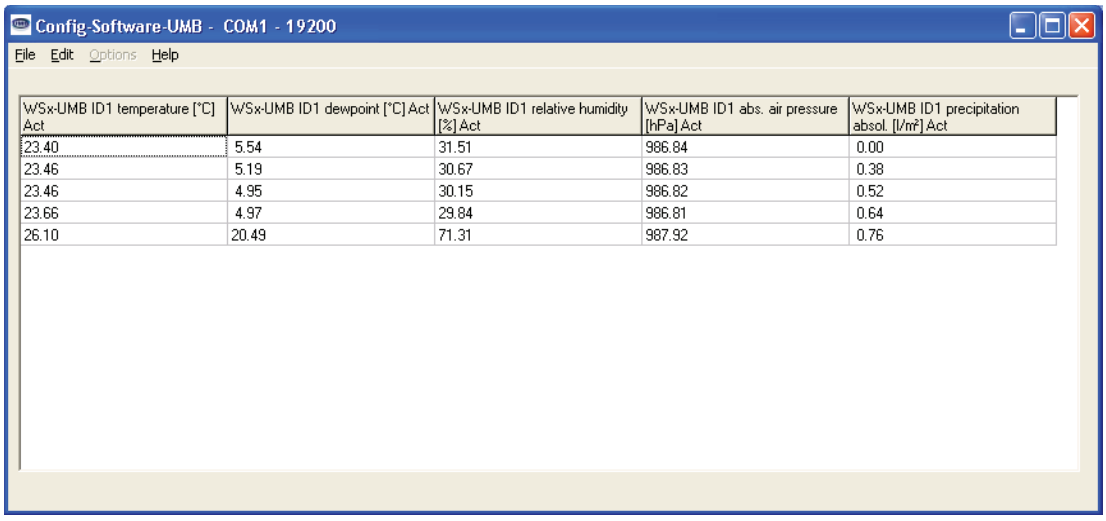
You can select the channel for measurement polling by the UMB-Config-Tool by clicking on the respective channel.



ChNr.	Measurement	Unit	Range	active
100	Act. temperature	°C	-40.00 .. 80.00	active
120	Min. temperature	°C	-40.00 .. 80.00	inactive
140	Max. temperature	°C	-40.00 .. 80.00	inactive
160	Avg. temperature	°C	-40.00 .. 80.00	inactive
105	Act. temperature	°F	-40.00 .. 176.00	inactive
125	Min. temperature	°F	-40.00 .. 176.00	inactive
145	Max. temperature	°F	-40.00 .. 176.00	inactive
165	Avg. temperature	°F	-40.00 .. 176.00	inactive
110	Act. dewpoint	°C	-40.00 .. 80.00	active
130	Min. dewpoint	°C	-40.00 .. 80.00	inactive
150	Max. dewpoint	°C	-40.00 .. 80.00	inactive
170	Avg. dewpoint	°C	-40.00 .. 80.00	inactive

Figure 14 Measurement Polling Channels

10.3.2 Example of Measurement Polling



WSx-UMB ID1 temperature [°C] Act	WSx-UMB ID1 dewpoint [°C] Act	WSx-UMB ID1 relative humidity [%] Act	WSx-UMB ID1 abs. air pressure [hPa] Act	WSx-UMB ID1 precipitation absol. [l/m²] Act
23.40	5.54	31.51	986.84	0.00
23.46	5.19	30.67	986.83	0.38
23.46	4.95	30.15	986.82	0.52
23.66	4.97	29.84	986.81	0.64
26.10	20.49	71.31	987.92	0.76

Figure 15 Example of Measurement Polling

Note: The UMB-Config-Tool is provided for test and configuration purposes only. It is not suitable for the permanent acquisition of measurement data. We recommend the use of professional software solutions for this purpose, e.g. SmartView3.

10.4 Operating Modes for Equipment Heating

Heating is configured to ‘Automatic’ when the product is delivered. This is the recommended operating mode for heating the sensor.

You can set the following operating modes:

Heater Mode	WS200-UMB	WS400-UMB	WS500-UMB	WS600-UMB
Automatic	●	●	●	●
Off	●	●	●	●
Mode 1		●	●	●
Eco-Mode 1		●		●

Note: Model WS300-UMB is not heated because neither rain sensor nor wind meter is included.

The rain sensor and wind meter settings must be adjusted in the respective configuration mask. The examples show the wind meter setting.

10.4.1 Automatic

In this operating mode, the sensor is maintained constantly at the control temperature, generally in order to prevent the effects of snow and ice.

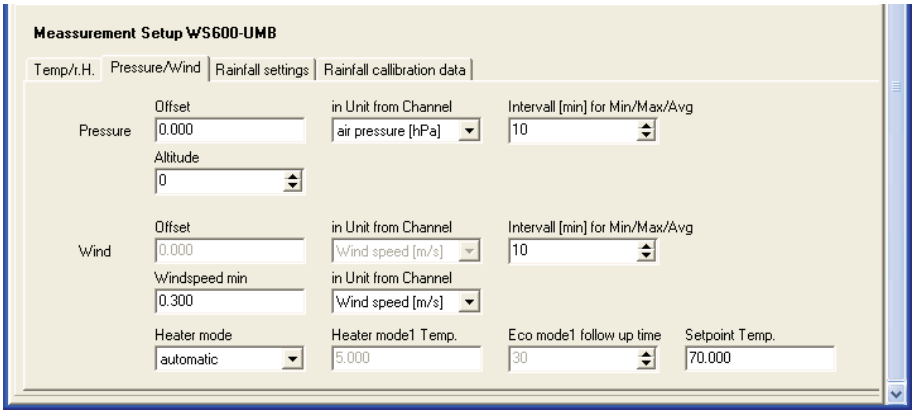


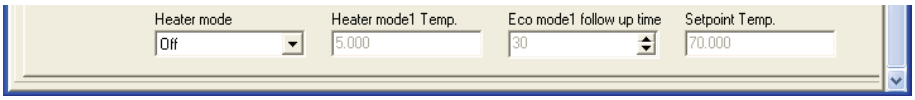
Figure 16: Operating Modes for Equipment Heating

Setpoint Temp.: The heating controls at this temperature (in °C)

The settings for the other values are not relevant.

10.4.2 Off

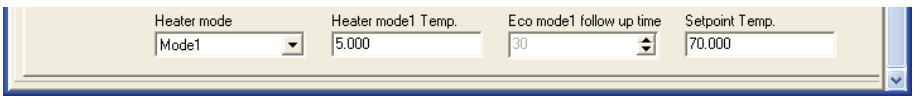
In the ‘Off’ operating mode heating is completely disabled. Winter operation is not possible in this operating mode because any icing might prevent the correct operation of the rain sensor or wind meter.



The value settings are not relevant.

10.4.3 Mode 1

In ‘Mode 1’ operating mode heating is only enabled when the outside temperature falls below the HeatingMode1 temperature (in °C). In this mode power consumption can be reduced in frost-free situations with no great restriction on winter operation.



Setpoint Temp.: The heating controls at this temperature (in °C)

Heating mode1 Temp.: Threshold temperature (in °C) with effect from which heating is enabled

The ‘Eco Mode1 follow-up time’ setting is not relevant.

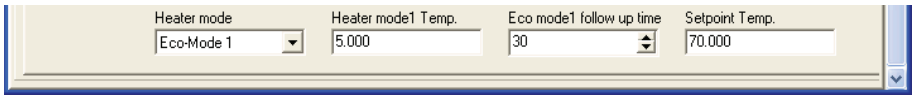
10.4.4 Eco-Mode 1

Eco Mode1 is an extreme energy saving mode.

Heating is only switched on when the following conditions are met:

- The outside temperature is below the threshold temperature and precipitation was detected. Heating then runs at the control temperature for 30 minutes (after the last precipitation event).
- When the outside temperature lies constantly below the threshold temperature and there was no heating for more than 20h, heating is switched on for 30 minutes as a precautionary measure in order to thaw any icing.

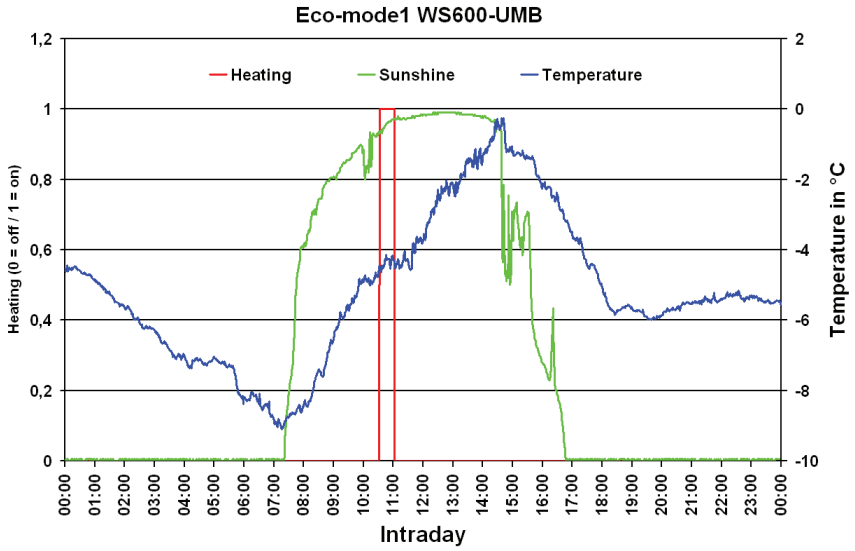
However, the precautionary 20h-heating only runs if the outside temperature was measured at below the threshold temperature for the entire period and conditions were constantly bright for at least 3 hours.



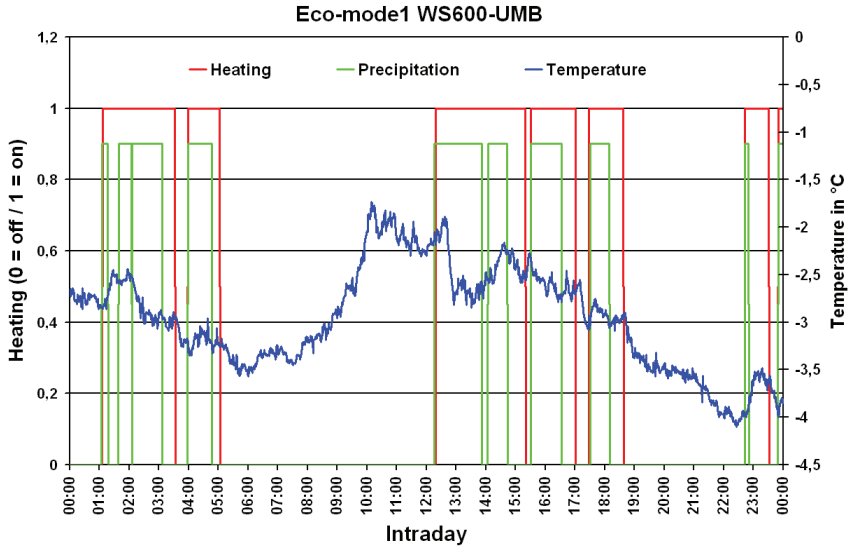
Setpoint Temp.:	The heating controls at this temperature (in °C)
Heating mode1 Temp.:	Threshold temperature (in °C) with effect from which heating is enabled
Eco mode1 follow-up time:	Follow-up time (in minutes)

Examples:

Outside temperature constantly below 5°C; no precipitation for more than 24h



Outside temperature constantly below 5°C; with precipitation



11 Firmware Update

To keep the sensor in accordance with the latest state-of-the-art, it is possible to carry out a firmware update on site with no need to remove the sensor and return it to the manufacturer.

The firmware update is carried out with the aid of the UMB-Config-Tool.

The description of the firmware update can be found in the instructions for the UMB-Config-Tool. Please download the latest firmware and UMB-Config-Tool from our website www.lufft.com and install it on a Windows® PC. You can find the instructions here:

Note: When a firmware update takes place, under certain circumstances the absolute precipitation quantities are reset (channel 600 – 660).

There is only one firmware for the entire product family which supports all models (WSx_Release_VXX.mot).

12 Maintenance

In principle the equipment is maintenance-free.

However, it is recommended to carry out a functional test on an annual basis. When doing so, pay attention to the following points:

- Visual inspection of the equipment for soiling
- Check the sensors by carrying out a measurement request
- Check the operation of the fan (not on WS200-UMB)

In addition, an annual calibration check by the manufacturer is recommended for the humidity sensor (not on WS200-UMB). It is not possible to remove or replace the humidity sensor. The complete compact weather station must be sent to the manufacturer for testing.

13 Technical Data

Power supply: 12 - 24VDC +/- 10%

Current consumption and power input - sensor:

WS200-UMB	ca. 50 mA / 1.2VA at 24VDC
WS300-UMB	ca. 145 mA / 3.5VA at 24VDC
WS400-UMB	ca. 170 mA / 4.1VA at 24VDC
WS500-UMB	ca. 150 mA / 3.6VA at 24VDC
WS600-UMB	ca. 175mA / 4.2VA at 24VDC

Current consumption and power input - heating:

WS200-UMB	833 mA / 20VA at 24VDC
WS400-UMB	833 mA / 20VA at 24VDC
WS500-UMB	833 mA / 20VA at 24VDC
WS600-UMB	1.7 A / 40VA at 24VDC

Dimensions including mounting bracket:

WS200-UMB	Ø 150mm, height 194mm
WS300-UMB	Ø 150mm, height 223mm
WS400-UMB	Ø 150mm, height 279mm
WS500-UMB	Ø 150mm, height 287mm
WS600-UMB	Ø 150mm, height 343mm

Weight including mounting bracket, excluding connection cable:

WS200-UMB	ca. 0.8 kg
WS300-UMB	ca. 1.0 kg
WS400-UMB	ca. 1.3 kg
WS500-UMB	ca. 1.2 kg
WS600-UMB	ca. 1.5 kg

Fastening: Stainless steel mast bracket for Ø 60 - 76mm

Protection class: III (SELV)

Protection type: IP64

Storage Conditions

Permissible storage temperature: -40°C ... +70°C
Permissible relative humidity: 0 ... 100% RH

Operating Conditions

Permissible operating temperature: -40°C ... +60°C
Permissible relative humidity: 0 ... 100% RH
Permissible altitude above sea level: N/A

RS485 interface, 2 wire, half-duplex

Data bits: 8
Stop bit: 1
Parity: No
Tri-state: 2 bits after stop bit edge
Adjustable baud rates: 1200, 2400, 4800, 9600, 14400, 19200[1], 28800, 57600

Housing: Plastic (PC)

[1] Factory setting and baud rate for firmware update

13.1 Measuring Range / Accuracy

13.1.1 Air temperature

Measurement process:	NTC
Measuring range:	-40°C ... +60°C
Resolution:	0.1°C(-20°C...+50°C), otherwise 0.2°C
Sensor accuracy:	+/- 0.2°C (-20°C ... +50°C), otherwise +/-0.5°C
Sampling rate:	1 minute
Units:	°C; °F

13.1.2 Humidity

Measurement process:	Capacitive
Measuring range:	0 ... 100% RH
Resolution:	0.1% RH
Accuracy:	+/- 2% RH
Sampling rate:	1 minute
Units:	% RH; g/m³; g/kg

13.1.3 Dewpoint Temperature

Measurement process:	Passive, calculated from temperature and humidity
Measuring range:	-40°C ... +60°C
Resolution:	0.1°C
Accuracy:	Computed +/- 0.7°C
Units:	°C; °F

13.1.4 Air Pressure

Measurement process:	MEMS sensor - capacitive
Measuring range:	300 ... 1200hPa
Resolution:	0.1hPa
Accuracy:	+/- 1.5hPa
Sampling rate:	1 minute
Unit:	hPa

13.1.5 Wind Speed

Measurement process:	Ultrasound
Measuring range:	0 – 60m/s
Resolution:	0.1m/s
Accuracy:	±0.3 m/s or ±3% (0...35 m/s) ±5% (>35m/s) RMSE
Response threshold:	0.3 m/s
Sampling rate:	10 seconds / 1 second for maximum value
Units:	m/s; km/h; mph; kts

13.1.6 Wind Direction

Measurement process:	Ultrasound
Measuring range:	0 – 359.9°
Resolution:	0.1°
Accuracy:	< 3° RMSE from 1.0 m/s
Response threshold:	0.3 m/s
Sampling rate:	10 seconds / 1 second for maximum value

13.1.7 Precipitation

Measurement process:	Radar sensor
Measuring range (drop size):	0.3 mm ... 5.0 mm
Liquid precipitation resolution:	0.01 mm
Precipitation types:	Rain, snow
Repeatability:	Typically > 90%
Response threshold:	0.01 mm
Sampling rate:	Event-dependent on reaching response threshold

13.2 Drawings

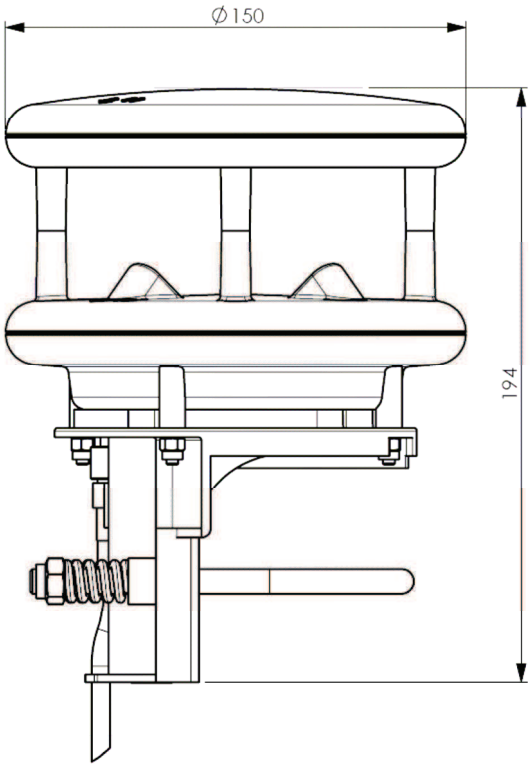


Figure 17: WS200-UMB

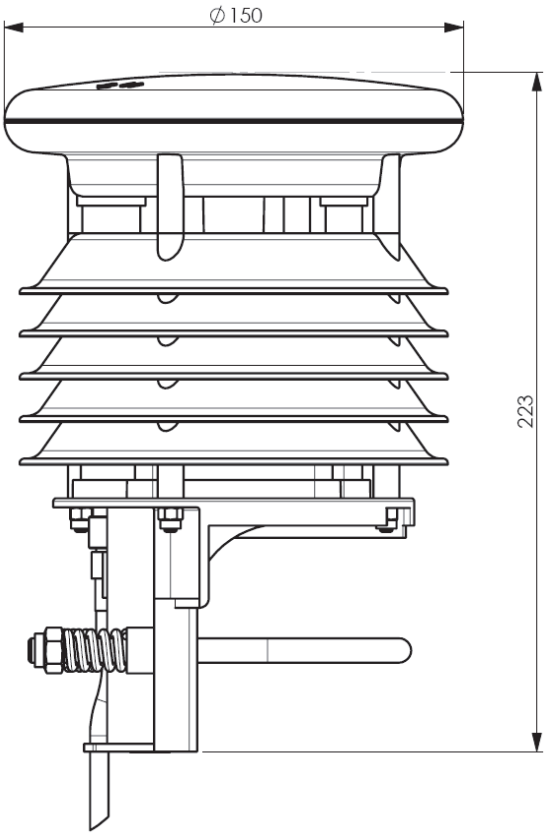


Figure 18: WS300-UMB

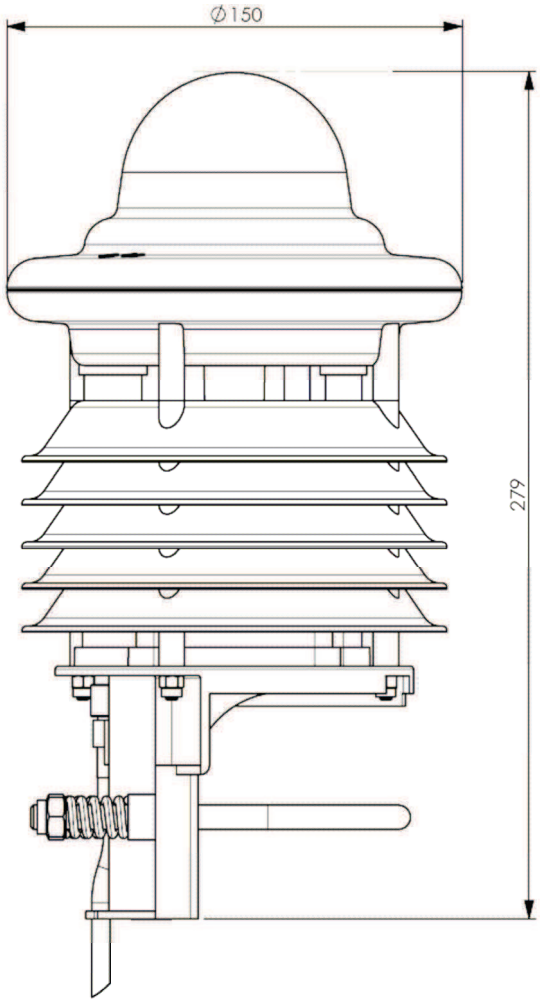


Figure 19: WS400-UMB

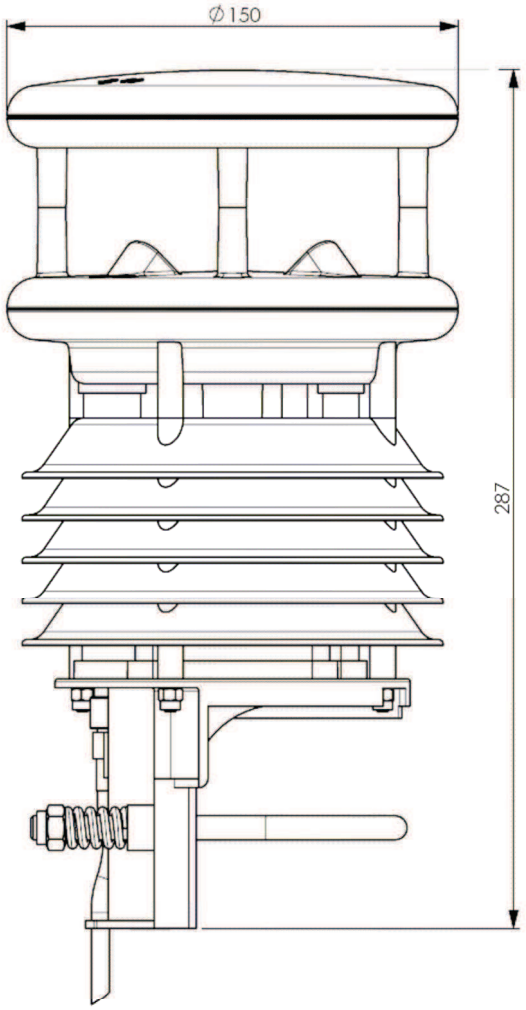


Figure 20: WS500-UMB

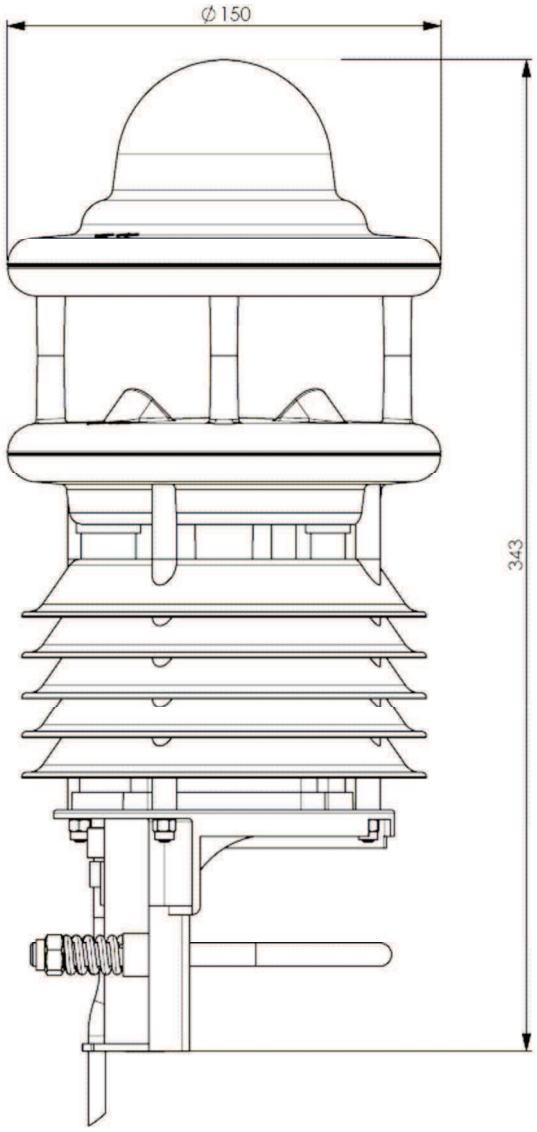


Figure 21: WS600-UMB

14 EC Certificate of Conformity

Product: **Compact Weather Station**

Type: **WS200-UMB (Order No.: 8371.U01)**
WS300-UMB (Order No.: 8372.U01)
WS400-UMB (Order No.: 8369.U01 / 8369.U02)
WS500-UMB (Order No.: 8373.U01)
WS600-UMB (Order No.: 8370.U01 / 8370.U02)

We herewith certify that the above mentioned equipment complies in design and construction with the Directives of the European Union and specifically the EMC Directive in accordance with 89/336/EC and the Low Voltage Directive in accordance with 73/23/EC.

The above mentioned equipment conforms to the following specific EMC Standards:

EN 61000-6-2:2005 Part 6-2: Generic Standards - Immunity for Industrial Environments

EN 61000-4-2	ESD
EN 61000-4-3	Radiated electromagnetic field
EN 61000-4-4	Burst
EN 61000-4-5	Surge
EN 61000-4-6	Conducted disturbances
EN 61000-4-8	Magnetic field 50Hz

EN 61000-6-3:2001 Part 6-3: Generic Standards - Emission Standard for Residential, Commercial and Light Industrial Environments

EN 55022:1998 +A1:2000 +A2:2003	Line-conducted disturbances
prEN 50147-3:2000	Radiated emission

IEC / CISPR 22 Class B

Fellbach, 28.11.2008 Axel Schmitz-Hübsch

15 Fault Description

Description	Cause - Remedy
The device does not allow polling	Check supply voltage Check interface connection False device ID → check ID
The device detects precipitation but it is not raining	Check for compliance with sensor installation instructions
The measured temperature appears too high or the humidity too low	Check the operation of the fan on the underside of the device

16 Disposal

16.1 Within the EC

The device must be disposed of in accordance with European Directives 2002/96/EC and 2003/108/EC (waste electrical and electronic equipment). Waste equipment must not be disposed of as household waste! For environmentally sound recycling and the disposal of your waste equipment please contact a certified electronic waste disposal company.

16.2 Outside the EC

Please comply with the applicable regulations for the proper disposal of waste electrical and electronic equipment in your respective country.

17 Repair / Corrective Maintenance

Please arrange for any faulty equipment to be checked and, if necessary, repaired by the manufacturer exclusively. Do not open the equipment and do not under any circumstances attempt to carry out your own repairs.

In matters of guarantee or repair please contact:

G. Lufft Mess- und Regeltechnik GmbH

Gutenbergstraße 20
70736 Fellbach

P.O. Box 4252
70719 Fellbach

Germany

Phone: +49 711 51822-0
Hotline: +49 711 51822-52
Fax: +49 711 51822-41

E-mail: info@lufft.de

or your local distributor.

17.1 Technical Support

Our Hotline is available for technical questions via the following e-mail address:

hotline@lufft.de

You can also consult frequently asked questions at http://www.lufft.com/ (menu header: FAQs).

18 Appendix

18.1 Channel List Summary

The channel assignment described here applies to online data requests in binary and ASCII protocol.

UMB Channel						Measuring Range		
act	min	max	avg	special	Measurement Variable (float)	min	max	unit
Temperature								
100	120	140	160		temperature	-40.0	60.0	°C
105	125	145	165		temperature	-40.0	140.0	°F
110	130	150	170		dewpoint	-40.0	60.0	°C
115	135	155	175		dewpoint	-40.0	140.0	°F
111					wind chill temperature	-60.0	70.0	°C
116					wind chill temperature	-76.0	158.0	°F
Humidity								
200	220	240	260		relative humidity	0.0	100.0	%
205	225	245	265		absolute humidity	0.0	1000.0	g/m³
210	230	250	270		mixing ratio	0.0	1000.0	g/kg
Pressure								
300	320	340	360		abs. air pressure	300	1200	hPa
305	325	345	365		rel. air pressure	300	1200	hPa
Wind								
				vect. avg				
400	420	440	460	480	wind speed	0	60.0	m/s
405	425	445	465	485	wind speed	0	216.0	km/h
410	430	450	470	490	wind speed	0	134.2	mph
415	435	455	475	495	wind speed	0	116.6	kts
500	520	540		580	wind direction	0	359.9	°

Precipitation Quantity			Range	unit
600	float	Precipitation Quantity - Absolute	0 … 100000	liters/m²
620	float	Precipitation Quantity - Absolute	0 … 100000	mm
640	float	Precipitation Quantity - Absolute	0 … 3937	inches
660	float	Precipitation Quantity - Absolute	0 … 3937008	mil
605	float	Precipitation Quantity - Differential	0 … 100000	liters/m²
625	float	Precipitation Quantity - Differential	0 … 100000	mm
645	float	Precipitation Quantity - Differential	0 … 3937	inches
665	float	Precipitation Quantity - Differential	0 … 3937008	mil
Precipitation Type				
700	Unsigned char	Precipitation Type	0 = No precipitation 60 = Liquid precipitation, e.g. rain 70 = Solid precipitation, e.g. snow	
Precipitation Intensity			**Range**	**unit**
800	float	Precipitation Intensity	0 … 200.0	l/m²/h
820	float	Precipitation Intensity	0 … 200.0	mm/h
840	float	Precipitation Intensity	0 … 7.874	in/h
860	float	Precipitation Intensity	0 … 7874	mil/h

Note: The channels which are actually available are dependent on the WSx-UMB type in use.

18.2 Channel List Summary per TLS2002 FG3

The following channels are available specifically for data requests for further processing in TLS format. These channels are only avalibale ind the binary protocol.

DE Type	UMB Channel	Meaning	Format	Range	Resolution	Coding
48	1048	Result message Air Temperature LT	16 bit	-30 ... +60°C	0.1°C	60.0 = 600d = 0258h 0.0 = 0d = 0000h -0.1 = -1d = FFFFh -30.0 = -300d = FED4h
53	1053	Result message Precipitation Intensity NI	16 bit	0 ... 200 mm/h	0.1 mm/h	0.0 = 0d = 0000h 200.0 = 2000d = 07D0h
54	1054	Result message Air Pressure LD	16 bit	800...1200 hPa	1 hPa	800 = 800d = 0320h 1200 = 1200d = 04B0h
55	1055	Result message Relative Humidity RLF	8 bit	10% ... 100%	1% RH	10% = 10d = 0Ah 100% = 100d = 64h
56	1056	Result message Wind Direction WR	16 bit	0 ... 359°	1°	0° (N) = 0d = 0000h 90° (O) = 90d = 005Ah 180° (S) = 180d = 00B4h 270° (W) = 270d = 010Eh FFFFh = not definable
57	1057	Result message Wind Speed. (average) WGM	16 bit	0.0 ... 60.0 m/s	0.1 m/s	0.0 = 0d = 0000h 60.0 = 600d = 0258h
64	1064	Result message Wind Speed (peak) WGS	16 bit	0.0 ... 60.0 m/s	0.1 m/s	0.0 = 0d = 0000h 60.0 = 600d = 0258h
66	1066	Result message Dewpoint Temperature TPT	16 bit	-30 ... +60°C	0.1°C	60.0 = 600d = 0258h 0.0 = 0d = 0000h -0.1 = -1d = FFFFh -30.0 = -300d = FED4h
71	1071	Result message Precipitation Type NS	8 bit			0 = No precipitation 60 = Liquid precipitation, e.g. rain 70 = Solid precipitation, e.g. snow

Note: The channels which are actually available are dependent on the WSx-UMB type in use.

The previous channels 1153 and 1253 are no longer supported. Channels 840 and 860 can be used in their place.

18.3 Communication in Binary Protocol

Only one example of an online data request is described in this operating manual. Please refer to the current version of the UMB Protocol for all commands and the exact mode of operation of the protocol (available for download at www.lufft.com).

Note: Communication with the sensor takes place in accordance with the master-slave principle, i.e. there may only be ONE requesting unit on a network.

18.3.1 Framing

The data frame is constructed as follows:

1	2	3 - 4	5 - 6	7	8	9	10	11 ... (8 + len) optional	9 + len	10 + len 11 + len	12 + len
SOH	<ver>	<to>	<from>	<len>	STX	<cmd>	<verc>	<payload>	ETX	<cs>	EOT

SOH	Control character for the start of a frame (01h); 1 byte
<ver>	Header version number, e.g.: V 1.0 → <ver> = 10h = 16d; 1 byte
<to>	Receiver address; 2 bytes
<from>	Sender address; 2 bytes
<len>	Number of data bytes between STX and ETX; 1 byte
STX	Control character for the start of payload transmission (02h); 1 byte
<cmd>	Command; 1 byte
<verc>	Version number of the command; 1 byte
<payload>	Data bytes; 0 – 210 bytes
ETX	Control character for the end of payload transmission (03h); 1 byte
<cs>	Check sum, 16 bit CRC; 2 bytes
EOT	Control character for the end of the frame (04h); 1 byte

Control characters: SOH (01h), STX (02h), ETX (03h), EOT (04h).

18.3.2 Addressing with Class and Device ID

Addressing takes place by way of a 16 bit address. This breaks down into a Class ID and a Device ID.

Address (2 bytes = 16 bit)				
Bits 15 – 12 (upper 4 bits)		**Bits 11 – 8 (middle 4 bits)**	**Bits 7 – 0 (lower 8 bits)**	
Class ID (0 to 15)		**Reserve**	**Device ID** (0 – 255)	
0	Broadcast		0	Broadcast
7	Compact Weather Station (WS200-UMB – WS600-UMB)		1 - 255	Available
15	Master or control devices			

ID = 0 is provided as broadcast for classes and devices. Thus it is possible to transmit a broadcast on a specific class. However this only makes sense if there is only one device of this class on the bus; or in the case of a command, e.g. reset.

18.3.3 Examples for Creating Addresses

If, for example, you want to address WS400-UMB with the device ID 001, this takes place as follows:

The class ID for the compact weather station is 7d = 7h;
the device ID is e.g. 001d = 001h

Putting the class and device IDs together gives the address 7001h (28673d).

18.3.4 Example of a Binary Protocol Request

If, for example, a compact weather station with the device ID 001 is to be polled from a PC for the current temperature, this takes place as follows:

Sensor:

The class ID for the compact weather station is 7 = 7h;

the device ID is 001 = 001h

Putting the class and device IDs together gives a target address of 7001h.

PC:

The class ID for the PC (master unit) is 15 = Fh;
the PC ID is e.g. 001d = 01h.

Putting the class and device IDs together gives a sender address of F001h.

The length <len> for the online data request command is 4d = 04h;

the command for the online data request is 23h;

the version number of the command is 1.0 = 10h.

The channel number is in <payload>; as can be seen from the channel list (page 38), the current temperature in °C in the channel is 100d = 0064h.

The calculated CRC is D961h.

The request to the device:

SOH	<ver>	<to>		<from>		<len>	STX	<cmd>	<verc>	<channel>		ETX	<cs>		EOT
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
01h	10h	01h	70h	01h	F0h	04h	02h	23h	10h	64h	00h	03h	61h	D9h	04h

The response from the device:

SOH	<ver>	<to>		<from>		<len>	STX	<cmd>	<verc>	<status>	<channel>		<typ>
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
01h	10h	01h	F0h	01h	70h	0Ah	02h	23h	10h	00h	64h	00h	16h

<value>				ETX	<cs>		EOT
15	**16**	**17**	**18**	**19**	**20**	**21**	**22**
00h	00h	B4h	41h	03h	C6h	22h	04h

Interpretation of the response:

<status> = 00h device o.k. (≠ 00h signifies error code; see page 42)

<typ> = Data type of the following value; 16h = float (4 bytes, IEEE format)

<value> = 41B40000h as a float value corresponds to 22.5

The temperature is therefore 22.5°C.

The correct data transmission can be checked with the aid of the check sum (22C6h).

Note: Little Endian (Intel, low byte first) applies when transmitting word and float variables of addresses or the CRC, for example. This means first the LowByte and then the HighByte.

18.3.5 Status and Error Codes in Binary Protocol

If a measurement request delivers the <status> 00h, the sensor is working correctly. You can find a complete list of additional codes in the description of the UMB protocol.

Extract from list:

<status>	Description
00h (0d)	Command successful; no error; all o.k.
10h (16d)	Unknown command; not supported by this device
11h (17d)	Invalid parameter
24h (36d)	Invalid channel
28h (40d)	Device not ready; e.g. initialization / calibration running
50h (80d)	Measurement variable (+offset) is outside the set display range
51h (81d)	
52h (82d)	Measurement value (physical) is outside the measuring range (e.g. ADC over range)
53h (83d)	
54h (84d)	Error in measurement data or no valid data available

18.3.6 CRC Calculation

CRC is calculated according to the following rules:

Norm: CRC-CCITT

Polynomial: 1021h = $x^{16} + x^{12} + x^5 + 1$ (LSB first mode)

Start value: FFFFh

You can find further information in the description of a CRC calculation in UMB Protocol.

18.4 Communication in ASCII Protocol

Text-based communication with devices is possible using ASCII protocol.

To do this, in the device configuration, interface settings, the protocol mode must be set to ASCII (see page 23).

ASCII protocol is network-compatible and serves exclusively for online data requests. The device will not respond to incomprehensible ASCII commands.

Note: The use of binary protocol is recommended for lengthy transmission routes (e.g. network, GPRS/UMTS), as ASCII protocol is unable to detect transmission errors (not CRC-secured).

Note: TLS channels are not available in ASCII protocol.

18.4.1 Structure

An ASCII command is introduced by the '&' character and completed by the CR (0Dh) sign. There is a space character (20h) between the individual blocks in each case; this is represented by an underscore character '_'. Characters that represent an ASCII value are in ordinary inverted commas.

18.4.2 Summary of ASCII Commands

Command	Function	BC	AZ
M	Online data request		l
X	Switches to binary protocol		k
R	Triggers software reset	●	k
D	Software reset with delay	●	k
I	Device information		k

These operating instructions describe the online data request only. You can find the description of the other commands in the UMB protocol.

18.4.3 Online Data Request (M)

Description: By way of this command, a measurement value is requested from a specific channel.

Request: '&'_<ID>[5]_'M'_<channel>[5] CR

Response: '$'_<ID>[5]_'M'_<channel>[5]_<value>[5] CR

<ID>[5] Device address (5 decimal places with leading zeros)

<channel>[5] Indicates the channel number (5 decimal places with leading zeros)

<value>[5] Measurement value (5 decimal places with leading zeros); a measurement value standardized to 0 – 65520d. Various error codes are defined from 65521d – 65535d.

Example:

Request: &_28673_M_00100

By way of this request, channel 100 of the device with address 28673 is interrogated (compact weather station with device ID 001).

Response: $_28673_M_00100_34785

This channel outputs a temperature from –40 to +60°C, which is calculated as follows:

0d	corresponds to	-40°C
65520d	corresponds to	+60°C
36789d	corresponds to	[+60°C – (-40°C)] / 65520 * 34785 +(-40°C) = 13.1°C

Note: TLS channels are not available in ASCII protocol.

18.4.4 Standardization of Measurement Values in ASCII Protocol

The standardization of measurement values from 0d – 65520d corresponds to the measuring range of the respective measurement variable.

Measurement Variable	Measuring Range		
	Min	Max	Unit
Temperature			
Temperature Dew point	-40.0	60.0	°C
	-40.0	140.0	°F
Wind chill temperature	-60.0	70.0	°C
	-76.0	158.0	°F
Humidity			
Relative humidity	0.0	100.0	%
Absolute humidity Mixing ratio	0.0	1000.0	g/m³ g/kg
Pressure			
Relative air pressure Absolute air pressure	300.0	1200.0	hPa
Wind			
Wind speed	0.0	60.0	m/s
	0.0	216.0	km/h
	0.0	134.2	mph
	0.0	116.6	kts
Wind direction	0.0	359.9	°
Rain			
Quantity	0.0	6552.0	liters / m²
	0.0	6552.0	mm
	0.0	257.9	inches
	0.0	257952.7	mil
Quantity since last request	0.0	655.2	liters / m²
	0.0	655.2	mm
	0.0	25.79	inches
	0.0	25795.2	mil
Precipitation type	0 = No precipitation 60 = Liquid precipitation, e.g. rain 70 = Solid precipitation, e.g. snow		
Precipitation intensity	0.0	200.0	l/m²/h
	0.0	200.0	mm/h
	0.0	7.874	in/h
	0.0	7874	mil/h

18.4.5 Error Codes in the ASCII Protocol

Various error codes are defined from 65521d – 65535d in addition to the standardisation for the transmission of measurement values.

Codes:

<code>	Description
65521d	Invalid Channel
65523d	Value Overflow
65524d	Value Underflow
65525d	Sensors can not determine the measured value (based on the prevailing conditions)
65534d	Invalid Calibration
65535d	Unknown Error

18.5 Communication in Terminal Mode

It is possible to communicate with a device in a very simple text-based manner using the terminal mode.

To do this, in the device configuration, interface settings, the protocol mode must be set to terminal (see page 23).

Note: In the case of communication in the terminal mode, only one single unit may be connected to the interface, as this protocol is **NOT** network-compatible. It is used for very simple measurement value requests.

Note: The use of binary protocol is recommended for lengthy transmission routes (e.g. network, GPRS/UMTS), as it is not possible to detect transmission errors in terminal mode (not CRC-secured).

Note: In the terminal mode, measurement values are not available in all units. Furthermore, status and error messages are not transmitted.

18.5.1 Structure

A terminal consists of an ASCII character and a numeric character. The command is completed with the <CR> sign. There is no echo on entry.

The individual values in the response are separated by a semi-colon (;). The response is completed with <CR><LF>.

An invalid terminal command is acknowledged with ‘FAILED’. Control commands are acknowledged with ‘OK’.

The command to which the response relates is given at the beginning of each response.

Note: No response times are specified in the terminal mode.

18.5.2 Terminal Commands

The terminal commands transmit the following values or have the following functions:

M0<CR>	Temperature in °C	(Channel 100)
	Dew point temperature in °C	(Channel 110)
	Wind chill temperature in °C	(Channel 111)
	Relative humidity in %	(Channel 200)
	Relative air pressure in hPa	(Channel 305)
	Wind speed in m/s	(Channel 400)
	Wind direction in °	(Channel 500)
	Precipitation quantity in l/m²	(Channel 600)
	Precipitation type	(Channel 700)
	Precipitation intensity in l/m²/h	(Channel 800)
M1<CR>	Temperature in °F	(Channel 105)
	Dew point temperature in °F	(Channel 115)
	Wind chill temperature in °F	(Channel 116)
	Relative humidity in %	(Channel 200)
	Relative air pressure in hPa	(Channel 305)
	Wind speed in mph	(Channel 410)
	Wind direction in °	(Channel 500)
	Precipitation quantity in inches	(Channel 640)
	Precipitation type	(Channel 700)
	Precipitation intensity in inches/h	(Channel 840)
M2<CR>	Current wind speed in m/s	(Channel 400)
	Min. wind speed in m/s	(Channel 420)
	Max. wind speed in m/s	(Channel 440)
	Avg. wind speed in m/s	(Channel 460)
	Vct. wind speed in m/s	(Channel 480)
	Current wind direction in °	(Channel 500)
	Min. wind speed in °	(Channel 520)
	Max. wind speed in °	(Channel 540)
	Vectorial wind speed in °	(Channel 580)
M3<CR>	Current wind speed in mph	(Channel 410)
	Min. wind speed in mph	(Channel 430)
	Max. wind speed in mph	(Channel 450)
	Avg. wind speed in mph	(Channel 470)
	Vct. wind speed in mph	(Channel 490)
	Current wind direction in °	(Channel 500)
	Min. wind direction in °	(Channel 520)
	Max. wind direction in °	(Channel 540)
	Vectorial wind direction in °	(Channel 580)
I0<CR>	Serial number; date of manufacture; project number; parts list version; SPLAN version; hardware version; firmware version; E2 version; device version	
I1<CR>	Outputs the device description	
R0<CR>	Executes a device reset	
R1<CR>	Resets the accumulated rain quantity and executes a device reset	
X0<CR>	Temporarily switches to UMB binary protocol	

Examples:

M0<CR> `M0;+026.0;+007.0;+027.8;+030.0;+0987.3;+001.6;+068.4;+00004.82;+060;+016.0;<CR><LF>`

M2<CR> `M2;+001.8;+001.1;+004.1;+001.4;+001.4;+085.7;+086.9;+089.6;+085.0;<CR><LF>`

I0<CR> `I0;001;0109;0701;004;005;001;016;011;00002;<CR><LF>`

R0<CR> `R0;OK;<CR><LF>`

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13.2 Drawings

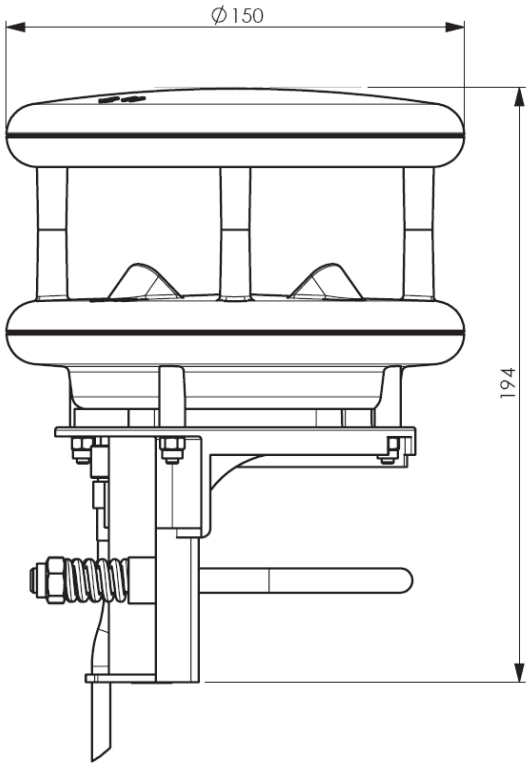

Figure 21: WS200-UMB

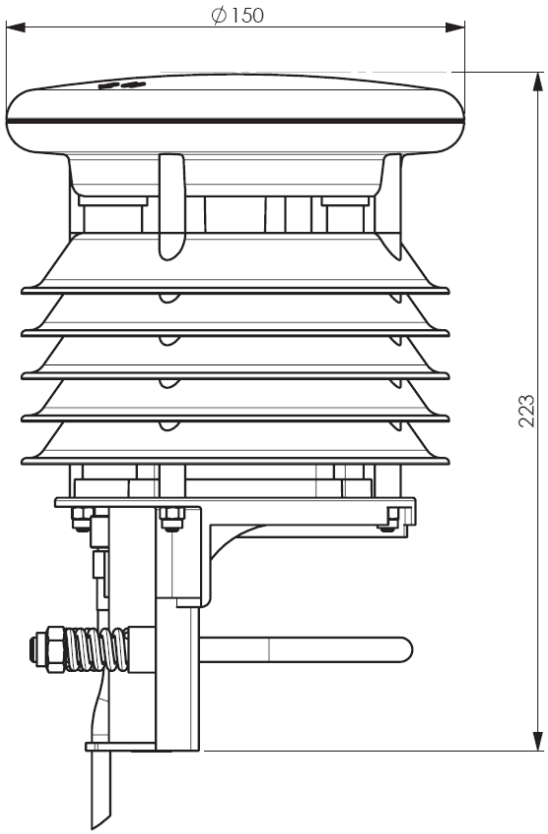

Figure 22: WS300-UMB