SPECIFICATION

Model No.	:	WS.01
Part No.	:	WS.01.305151
Product Name	:	Heavy Duty Screw Mount Antenna - Dual-Band 2.4~5.2GHz
Description	:	2.4GHz~5.2GHz suitable for ISM Bands/ZigBee/WLAN/Bluetooth IEEE.802.11/IEEE.802.15 3M CFD-200 RP-SMA(M) - Standard Height 29mm Diameter 49mm **RoHS Compliant**

Version	Date	Page	Revision Description	Prepared	Approved
A	May 11th 2009	All	New Product	TW Product Centre	Zita Lin
B	Jul 20th 2010	All	Mechanical Change	TW Product Centre	Zita Lin

I. Scope

WS.01 Hercules is a high efficiency, high gain thread mount dual band wireless antenna for external use on vehicles and outdoor assets worldwide. Omni-directional gain across both bands ensures constant reception and transmission making the WS.01 an ideal solution for a Zigbee Wireless Mesh for remote applications e.g. – remote metering.

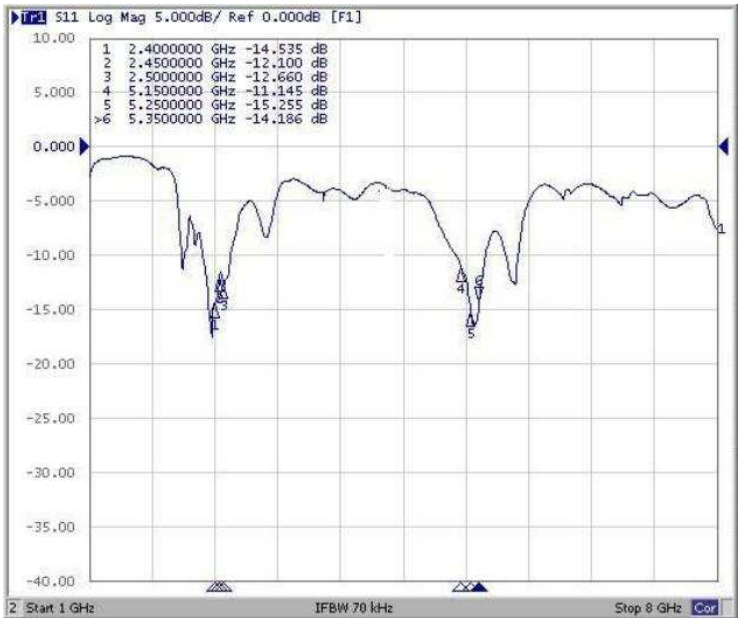
It has been designed for heavy duty work with extra thick threads; with durable UV-resistant PVC housing is resistant to vandalism and direct attack. At only 29mm high it complies with the latest EU height restrictions directives for roof-mounted objects, whilst also enabling covert operation with a diameter of 49mm.

II. Specifications

ELECTRICAL						
Frequency (GHz)	2.4	2.45	2.5	5.15	5.25	5.35
VSWR	1.46	1.66	1.6	1.76	1.41	1.48
Return Loss (dB)	-14.5	-12.1	-12.7	-11.1	-15.3	-14.2
Impedance	50Ω					
Polarization	Linear - Horizontal					
Radiation Pattern	Omni					
Cable/Connectors	3M CFD-200/RP-SMA(M)					
Recommended Mounting Torque	95Nm					
Maximum Mounting Torque	135Nm					
MECHANICAL						
Dimensions	Height 29mm x Diameter 49mm					
Casing	UV resistant PVC					
Base and thread	Nickel plated steel					
Thread diameter	18mm					
Weather proof gasket	CR4305 foam with 3M9448B double-side adhesive					
ENVIRONMENTAL						
Waterproof	IP-65					
Corrosion	5% NaCl for 96hrs - Nickel plated steel base and thread					
Temperature Range	-40℃ to +85℃					
Thermal Shock	100 cycles -40℃ to +80℃					
Humidity	Non-condensing 65℃ 95% RH					
Shock (drop test)	1m drop on concrete 6 axes					
Cable pull	8 KGf					

III. Antenna S11 Parameters

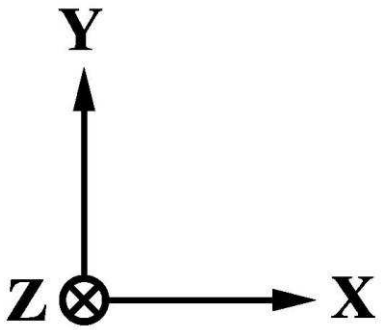
III.1. Return Loss



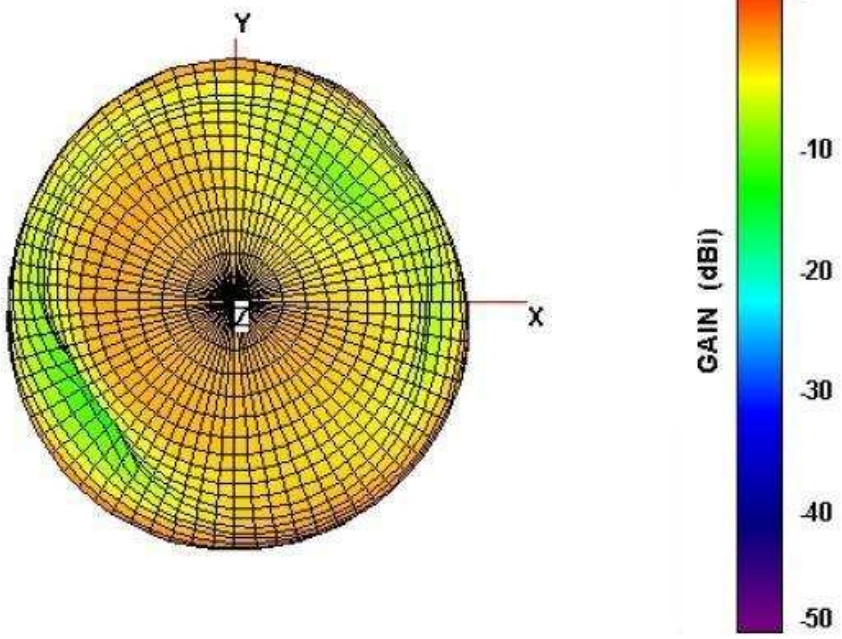
III.2. VSWR

IV. Antenna Radiation

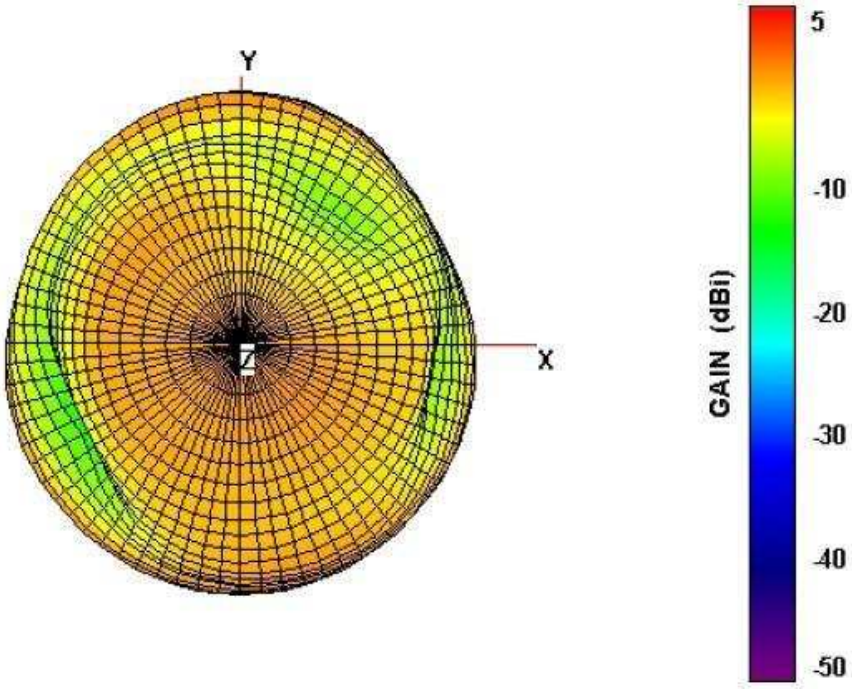
IV.1. 3D Radiation Pattern



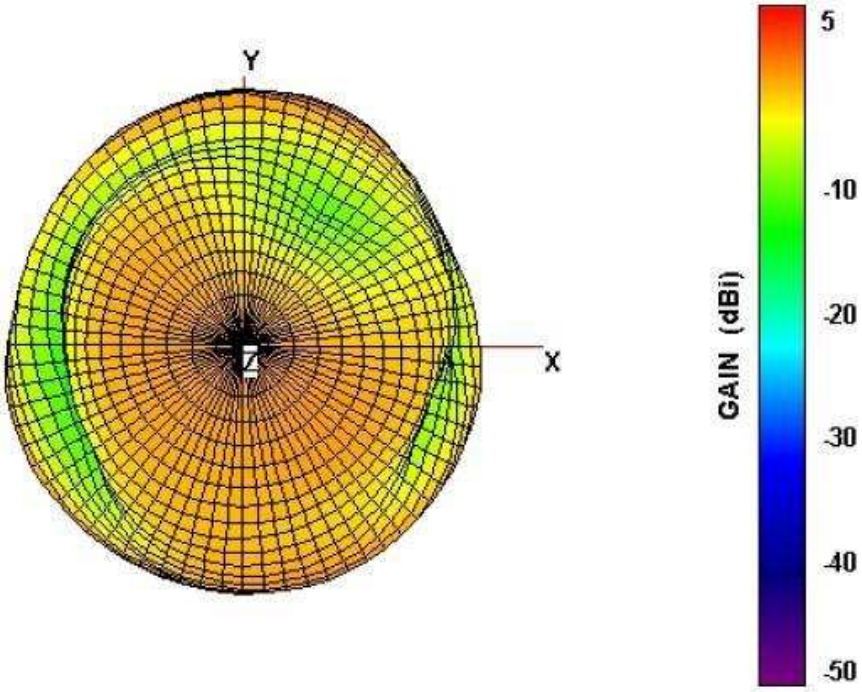
2.4GHz



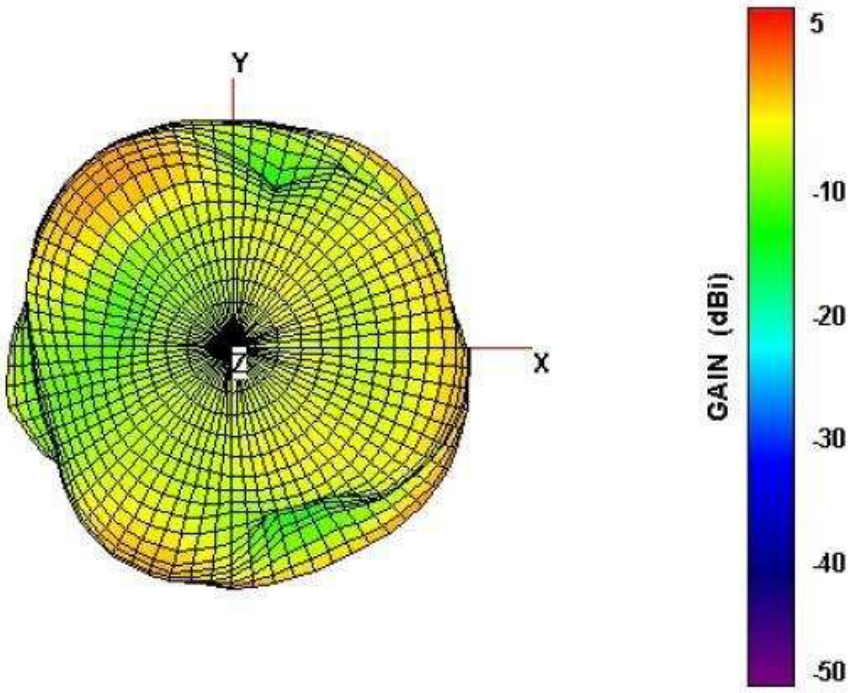
2.45GHz



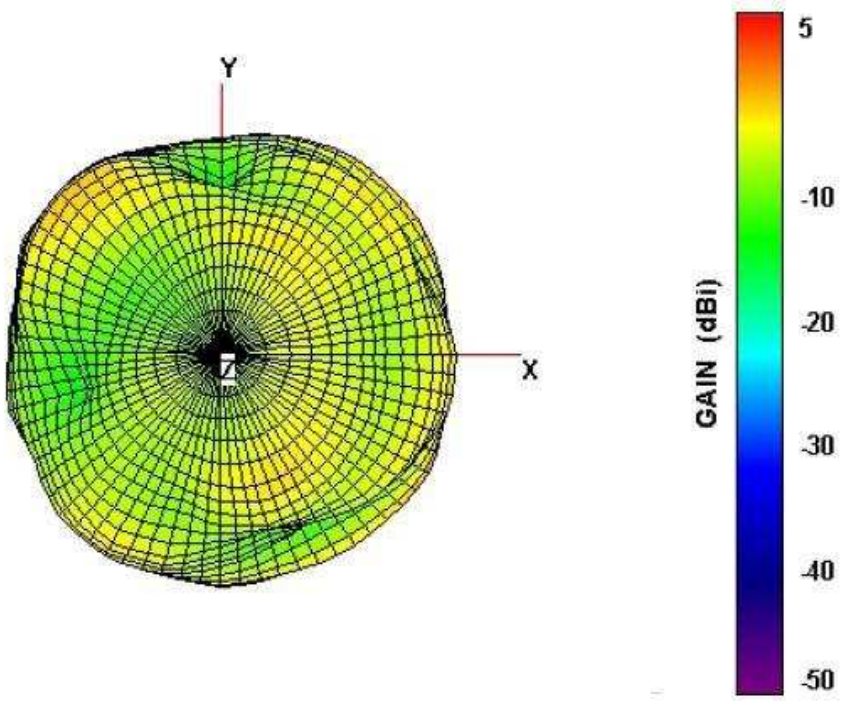
2.5GHz



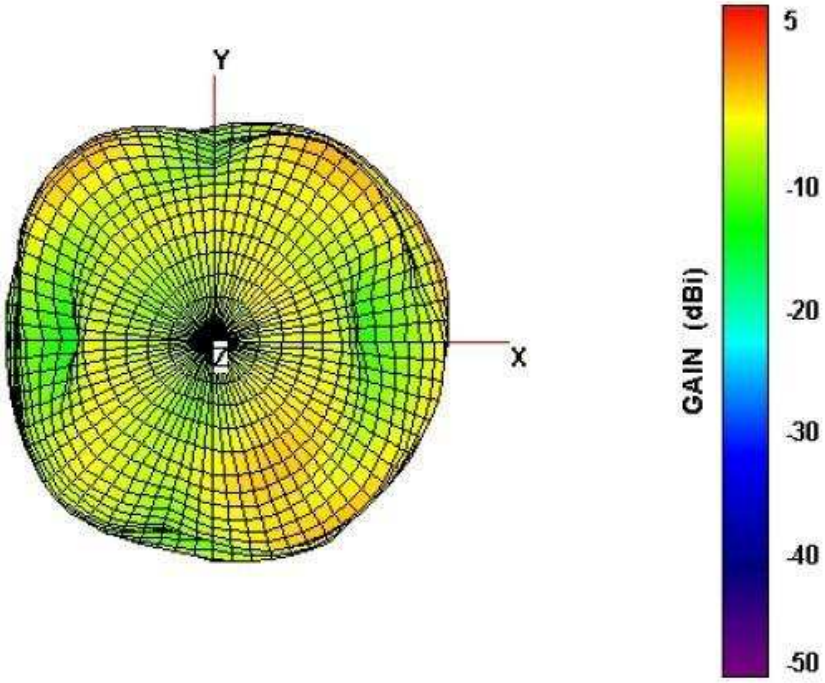
5.15GHz



5.25GHz



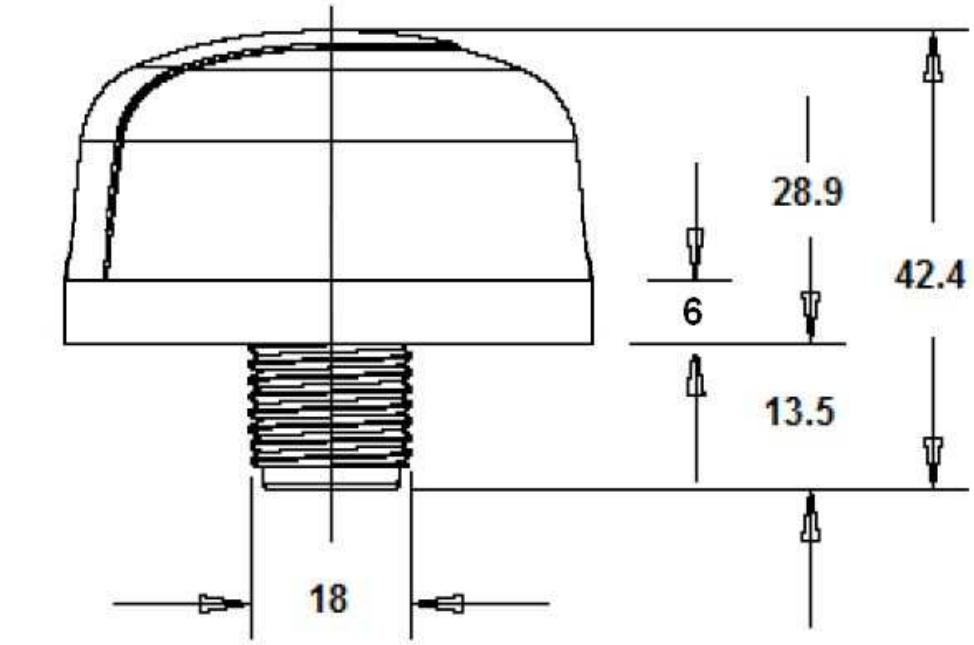
5.35GHz

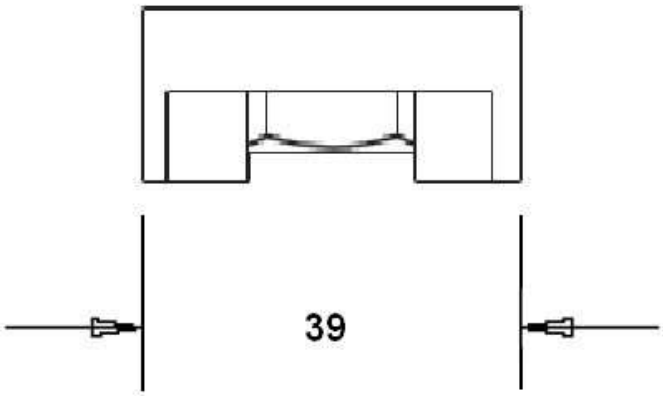


IV.2. Result Summary

Channel	2400	2450	2500	5150	5250	5350
Note						
Ant. Port Input Pwr. (dBm)	0	0	0	0	0	0
Tot. Rad. Pwr. (dBm)	-1.98761	-1.61782	-1.77651	-3.01447	-3.8051	-3.23583
Peak EIRP (dBm)	3.0513	4.05447	4.1152	4.7407	4.37813	4.71773
Directivity (dBi)	5.03891	5.67229	5.89171	7.75517	8.18322	7.95356
Efficiency (dB)	-1.98761	-1.61782	-1.77651	-3.01447	-3.8051	-3.23583
Efficiency (%)	63.276	68.8997	66.4276	49.952	41.638	47.4698
Gain (dBi)	3.0513	4.05447	4.1152	4.7407	4.37813	4.71773
NHPRP ±Pi/4 (dBm)	-3.25016	-2.86259	-3.02232	-4.67614	-5.69757	-5.29538
NHPRP ±Pi/6 (dBm)	-4.39266	-4.02363	-4.19465	-6.60698	-7.70604	-7.19484
NHPRP ±Pi/8 (dBm)	-5.32364	-5.01353	-5.19258	-7.87659	-8.98205	-8.37507
Upper Hem. PRP (dBm)	-6.08301	-5.80993	-5.86805	-7.71601	-8.71586	-8.08409
Lower Hem. PRP (dBm)	-4.13045	-3.70008	-3.92182	-4.81064	-5.49788	-4.95872
NHPRP4 / TRP Ratio (dB)	-1.26255	-1.24477	-1.2458	-1.66167	-1.89247	-2.05955
NHPRP4 / TRP Ratio (%)	74.773	75.0798	75.062	68.2076	64.6774	62.2365
NHPRP6 / TRP Ratio (dB)	-2.40505	-2.4058	-2.41814	-3.59251	-3.90094	-3.95901
NHPRP6 / TRP Ratio (%)	57.4771	57.4672	57.3041	43.7269	40.7292	40.1882
NHPRP8 / TRP Ratio (dB)	-3.33604	-3.39571	-3.41607	-4.86212	-5.17695	-5.13924
NHPRP8 / TRP Ratio (%)	46.387	45.754	45.54	32.6428	30.3602	30.625
UHPRP / TRP Ratio (dB)	-4.0954	-4.19211	-4.09154	-4.70155	-4.91076	-4.84826
UHPRP / TRP Ratio (%)	38.9457	38.0881	38.9804	33.8723	32.2793	32.7472
LHPRP / TRP Ratio (dB)	-2.14284	-2.08226	-2.1453	-1.79617	-1.69279	-1.7229
LHPRP / TRP Ratio (%)	61.0543	61.9119	61.0196	66.1277	67.7207	67.2528
Front/Back Ratio (dB)	3.42725	3.56765	3.94055	10.1253	13.1799	10.9587
Phi BW (°)	112	96	86	42	40	42
+ Phi BW (°)	66	58	52	17	19	24
- Phi BW (°)	46	38	34	25	21	18
Theta BW (°)	49	35	35	36	34	32
+ Th. BW (°)	25	20	24	23	23	12
- Th. BW (°)	24	15	11	13	11	20
Boresight Phi (°)	270	270	270	75	75	60
Boresight Th. (°)	105	105	105	135	135	150
Maximum Power (dBm)	3.0513	4.05447	4.1152	4.7407	4.37813	4.71773
Minimum Power (dBm)	-15.0552	-14.2956	-14.3893	-15.5291	-16.4014	-15.3489
Average Power (dBm)	-2.26887	-1.84221	-2.02397	-3.4037	-4.13521	-3.4448
Max/Min Ratio (dB)	18.1065	18.3501	18.5045	20.2699	20.7795	20.0666
Max/Avg Ratio (dB)	5.32018	5.89668	6.13917	8.14441	8.51333	8.16253
Min/Avg Ratio (dB)	-12.7863	-12.4534	-12.3653	-12.1254	-12.2662	-11.9041
Average Gain (dB)	-1.98761	-1.61782	-1.77651	-3.01447	-3.8051	-3.23583
E-Plane BW (°)	45	33	34	32	31	35
+ E-Plane BW (°)	20	18	22	19	20	12
- E-Plane BW (°)	25	15	12	13	11	23
H-Plane BW (°)	115	105	93	51	45	39
+ H-Plane BW (°)	69	70	65	16	16	20
- H-Plane BW (°)	46	35	28	35	29	19

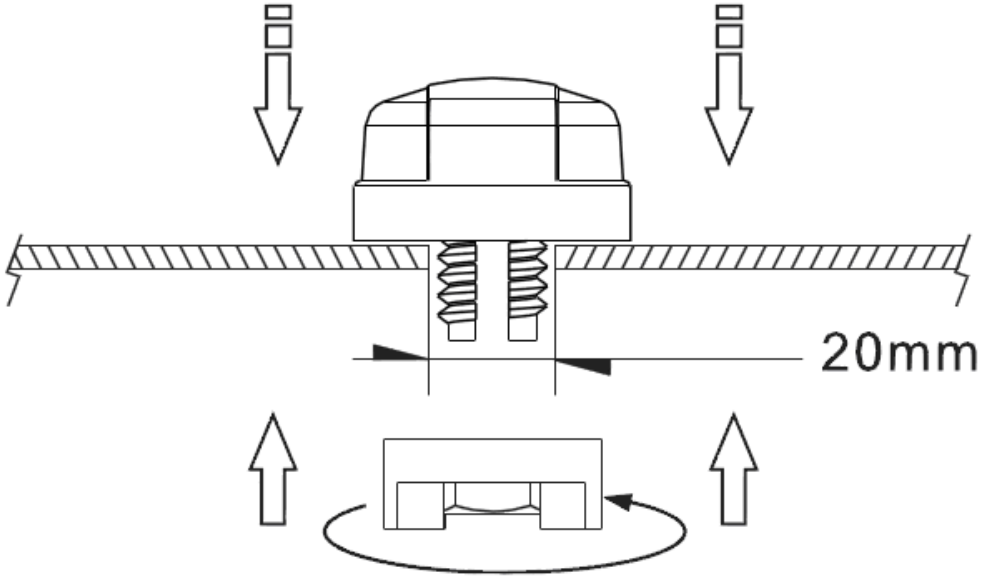
V. Technical Drawing





Unit : mm

VI. Installation



Recommended torque for mounting is 95Nm or 70ftlbs

Maximum torque for mounting is 135.6Nm or 100ft lbs