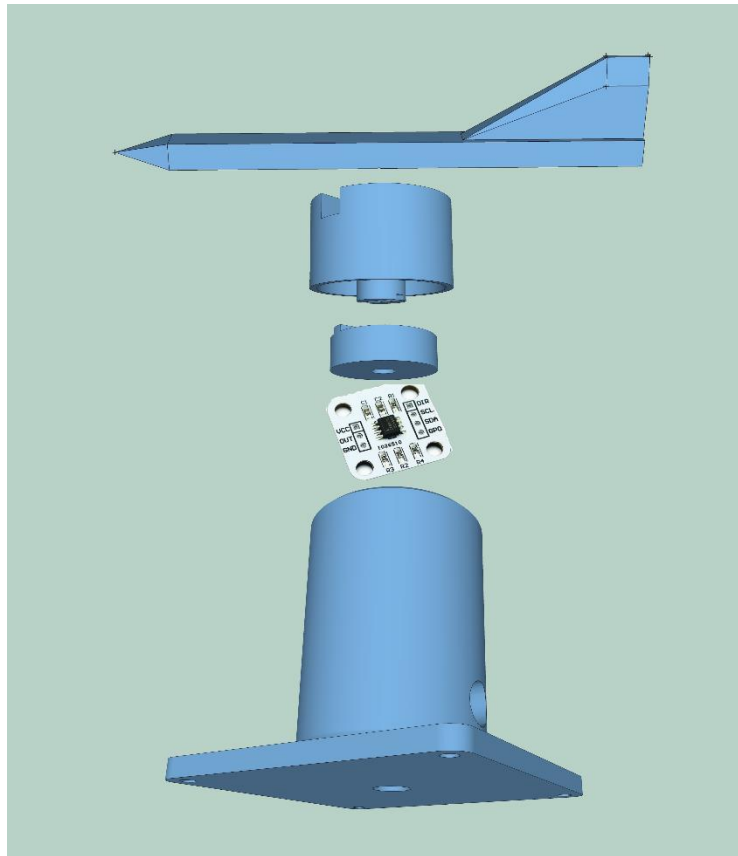


mySQMPROESP WINDDIRECTION3DPRINT SENSOR

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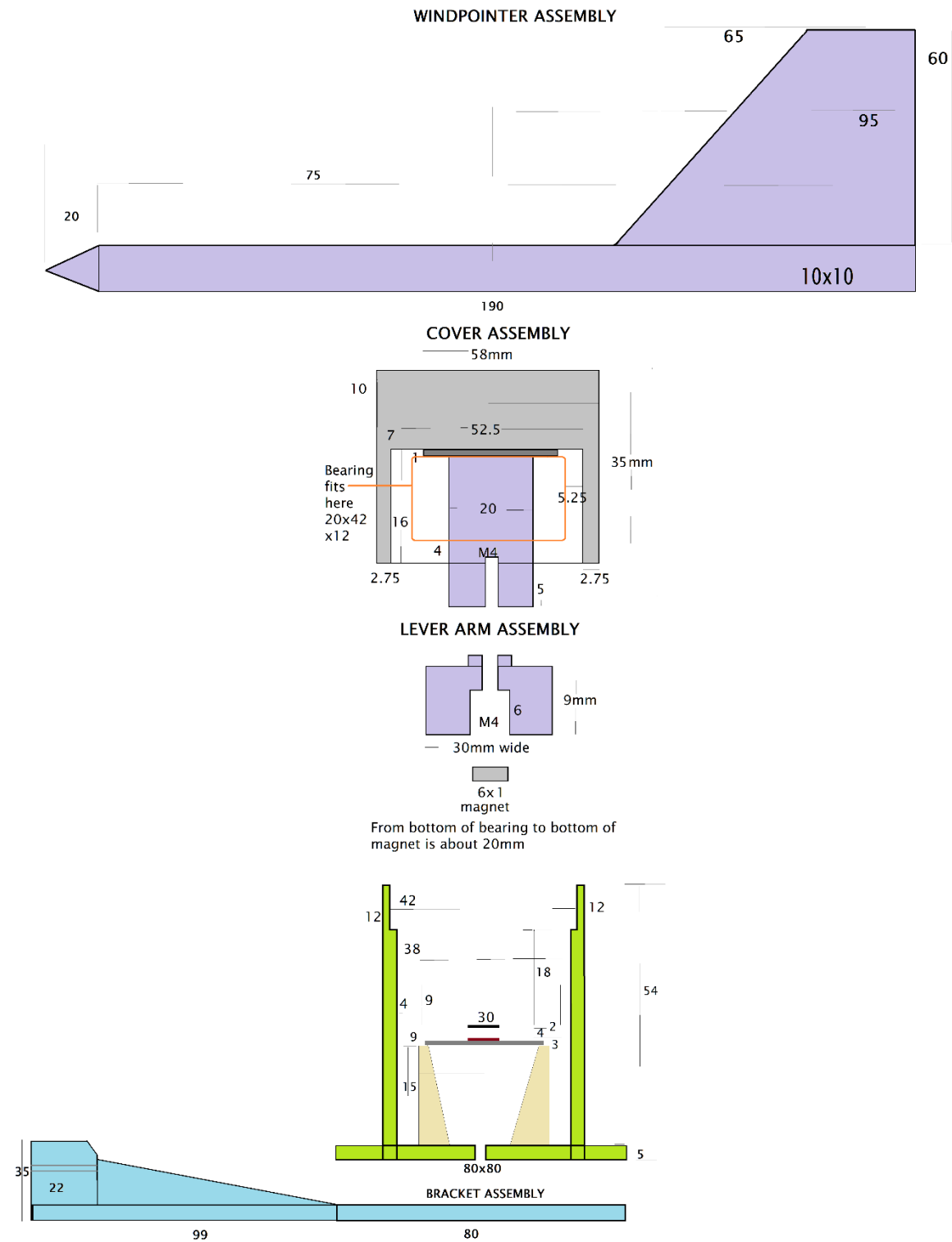
//TODO Replace picture with finished unit

Contents

mySQMPROESP WINDDIRECTION3DPRINT SENSOR	1
OVERALL DESIGN PRINCIPLES.....	3
DIMENSIONS	3
WINDPOINTER TIP ASSEMBLY	4
WINDPOINTER ASSEMBLY	4
COVER ASSEMBLY	4
LEVER ARM ASSEMBLY	5
BASE ASSEMBLY	5
OPTIONAL MOUNTING BRACKET	6
PARTS LIST.....	7
PRINT INSTRUCTIONS.....	9
ASSEMBLY INSTRUCTIONS.....	10
WINDPOINTER TIP ASSEMBLY	10
WINDPOINTER ASSEMBLY	10
BASE ASSEMBLY	10
COVER AND LEVER ARM ASSEMBLY	10
ASSEMBLY PHOTOS	11
WIRING	12
AS5600 MODULE PCB8.....	12
AS5600 MODULE PCB6/7	12
TESTING THE WINDDIRECTION 3DPRINT SENSOR	13

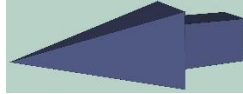
OVERALL DESIGN PRINCIPLES

DIMENSIONS



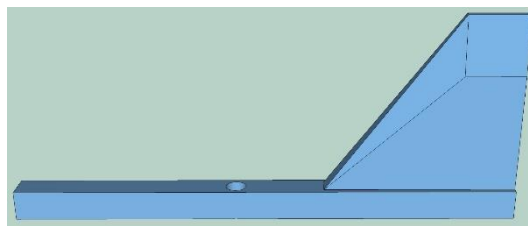
WINDPOINTER TIP ASSEMBLY

The wind pointer tip has a hollow portion to allow a small lead ballast to be fitted before assembly to the front of wind pointer assembly [push interference fit – secure with super glue or hot glue]. The ballast helps in pointing ability.



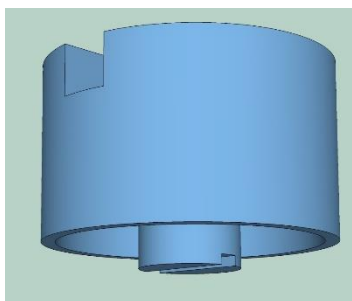
WINDPOINTER ASSEMBLY

The wind vane mounts into the 10mm recess groove on the top of the cover assembly. A small notch in the wind vane arm and center M3 bolt hole helps positioning the vane appropriately on the cover assembly. There are two designs [1, 2] which have different wind vane heights. One or the other may be more suited to your local conditions [the larger height should give better results in low wind environments]



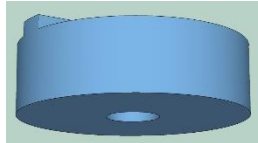
COVER ASSEMBLY

The cover assembly forms the rotating head of the sensor with a magnet attached. A large 6004 2RS low friction bearing is used to allow a center column diameter of 12mm, providing ample strength to handle strong winds. At the bottom of the center column is fitted a lever arm [using a slotted recess and a M4 x 10mm hex bolt]. A small round magnet [6mmx1mm] fits onto the head of the hex bolt [and secured in place with super glue or hot glue]. The cover assembly when completed is attached to the Base assembly by press fitting the bearing into the recess of the base assembly and is held in place by an interference fit.



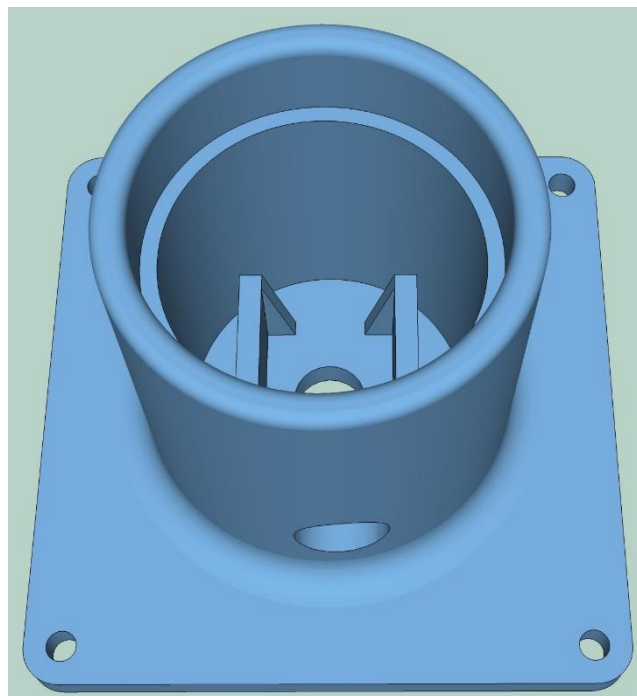
LEVER ARM ASSEMBLY

The lever arm is slotted to fit into a recess at the bottom of the center column of the Cover assembly. It is held in place with a M4 x 10mm hex bolt. The small 6mmx3mm magnet is fitted into a recessed hole in the bottom of the Lever Arm assembly and glued into place using hot glue. The lever arm assembly rotates as the cover assembly rotates and the magnet rotates with it, just above the sensor. If the AS5600 sensor module is mounted underneath the lever arm [sensor directly underneath magnet with air spacing 3-5mm], the magnet will pass over the module generating an angle indication representing the direction.



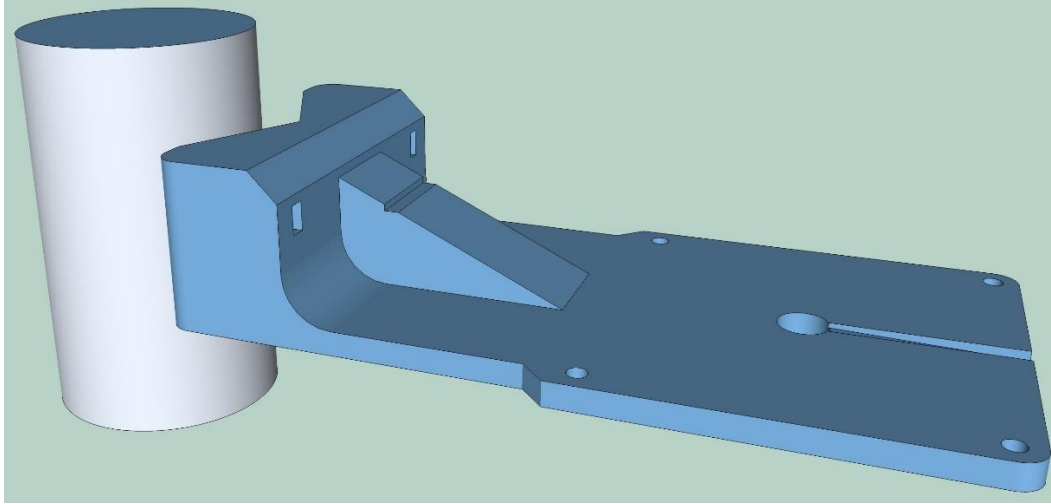
BASE ASSEMBLY

This assembly has an 80x80mm square plate 5mm thick to allow connection to a post or optional mounting arm bracket. A 10mm hole in the base plate allows for water drainage if by some reason water enters the assembly. A 12mm hole is provided for the GX12 4P connector. At the top of the base unit, a 42mm recess is used which will house the 6004 2RS low friction bearing. The wall thickness of the base unit is 6mm to provide strength. The AS5600 module is secured to the center of the base assembly at the specified location, ensuring that the module can detect the magnet as it passes near to it.



OPTIONAL MOUNTING BRACKET

The optional mounting bracket is for mounting the anemometer on a 2.54mm [1"] diameter pole. Two plastic zip ties can be used to secure the bracket to the pole, and the anemometer can be bolted to the bracket using [4] M4x15mm bolts.



The center hole and 4mm wide sloping trough allows water to escape.

PARTS LIST

Quantity	Item
1	Wind Pointer Tip Assembly
1	Wind Pointer Assembly
1	Base Assembly
1	Cover Assembly
1	Lever arm Assembly
3	Cup and Arm Assembly
2	Hex bolt 4M x 10mm
1	Bearing 6004 2RS low friction, 20x42x12mm [ID/OD/Thickness]
1	AS5600 Magnetic angle sensor and magnet
1	Small round magnet 6mm round, 3mm deep [optional]
1	GX12 4P Aviation male connector, waterproof, 12mm diameter
1	GX12 4P Aviation female connector, 12mm diameter
1	3M 3-core weather proof cable

AS5600 Magnetic Sensor and Magnet Aliexpress DEXIANG Store

<https://www.aliexpress.com/item/4000861019000.html>

\$2.30USD

NOTE: YET TO DECIDE ON 6x1 MAGNET OR 6x3 MAGNET: NEED MORE TESTS

Magnet 6mm x 3mm N35 Round Magnets Aliexpress YCHEN Store

<https://www.aliexpress.com/item/32953346950.html>

\$2.47USD



Bearing, 20x42x12mm Aliexpress wuhushiyu Store

<https://www.aliexpress.com/item/4000038143034.html>

\$2.82USD

6004-2rs 20*42*12mm 1pc



GX12 4P Connector, male and female pair push weatherproof Aliexpress ATOPELEC Store

[Note: This is for 2 sets, the other one can be used for the Wind Direction Sensor]

<https://www.aliexpress.com/item/32831416252.html>

\$2.25



PRINT INSTRUCTIONS

Nozzle	0.4mm	
Layer Height	0.2mm	
Print Speed	30	
Infill	10%	[Windpointer = 20%, LeverArm infill = 100%]
Supports	No	[Cover, Windpointertip, Base = Supports]

I used PLA in the prototype. PLA exposure to sun and weather will deteriorate as PLA is based on corn starch. Might be okay is painted to protect PLA from elements.

Recommend PETG for usage. PETG is strong and low shrinkage.

Do not recommend ABS due to shrinkage.

Cover Assembly

≈ 3 hours print time

WindPointerTip Assembly

≈ ½ hours print time

WindPointer Assembly

≈ 2½ hours print time

LeverArm Assembly

≈ 1 hours print time

Base Assembly

≈ 6 hours print time

Mounting Bracket Assembly

≈ 6 hours print time

ASSEMBLY INSTRUCTIONS

WINDPOINTER TIP ASSEMBLY

- Fit a small amount of lead to the hollow recess of the pointer tip
- Secure the wind pointer tip in place by inserting it into the recess of the end of the Windpointer assembly [super glue or hot glue]

WINDPOINTER ASSEMBLY

- The wind pointer fits into the 10mm deep groove of the cover assembly
- To work effectively, there is a small groove on the base side of the wind pointer assembly. This groove is to help position the wind pointer on the cover assembly
- Position the wind pointer so the groove is over the center point of the cover assembly. Secure the wind pointer in place with an M4x10mm hex bolt [do not overtighten]

BASE ASSEMBLY

GX12 Connector wiring to AS5600 board

- Solder 4 different colored wires (80-100mm) to GX12 connector pins, slip heat shrink tube over solder connections and apply heat to shrink tube
- Using a flat file, slightly file the hole for the GX12 connector to create a slight flat surface. Do not take off too much material, only 1mm is enough
- Fit GX12 connector to the base assembly by inserting into 12mm hole at base and tighten lock nut (do not overtighten). You can use a rubber washer on the outside to prevent possible water leakage [the rubber waterproof ring is sufficient]
- Wire connector to AS5600 module [3V3 to VCC, GND, SDA and SCL], use heat-shrink tube, ensure correct wires go to correct pins
- Secure AS5600 module in place at the specified place with hot glue gun. Ensure there is a small gap (3-5mm) between the magnet and the AS5600 module.

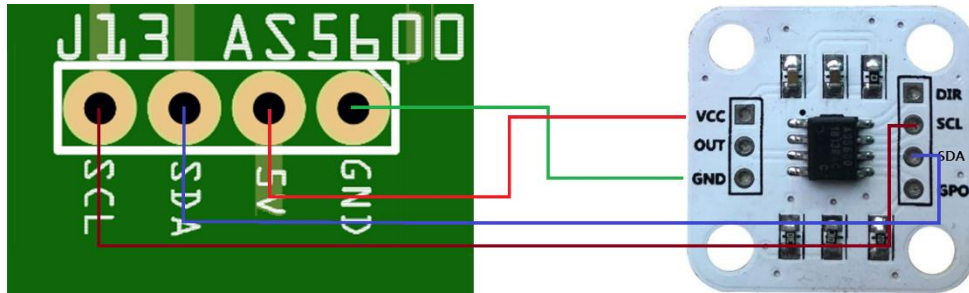
COVER AND LEVER ARM ASSEMBLY

- Fit Bearing to Cover center column
- Connect Lever Bar to Cover center column. Secure with M4 bolt, do NOT overtighten
- Mount Magnet in Lever Bar in recess hole for M4 on top of hex bolt, secure with super glue or hot glue
- Insert cover into place in Base by positioning Cover assembly over Base and pressing downwards till bearing is fully inserted in Base assembly

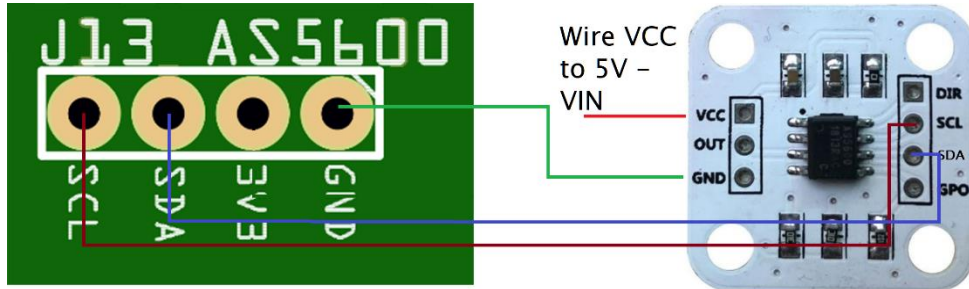
ASSEMBLY PHOTOS

WIRING

AS5600 MODULE PCB8



AS5600 MODULE PCB6/7



TESTING THE WINDDIRECTION 3DPRINT SENSOR

Use the test program ***TEST_WINDDIRECTION3DPRINT.ino*** to test the wind direction sensor. There is no need to calibrate the unit if you followed the instructions and did not change any of the print size measurements.

Mount the sensor on the bracket and secure in place.

Use the test program determine the 0 angle position.

Carefully holding the wind vane in place, rotate the entire assembly so that the front of the wind vane is pointing due NORTH. Secure the assembly in place.

Reload the controller with the mySQMPROESP firmware, with the WINDDIRECTIONSENSOR and WINDDIRECTION3DPRINT defined in *controllerconfig.h*