Orbit Irrigation Products

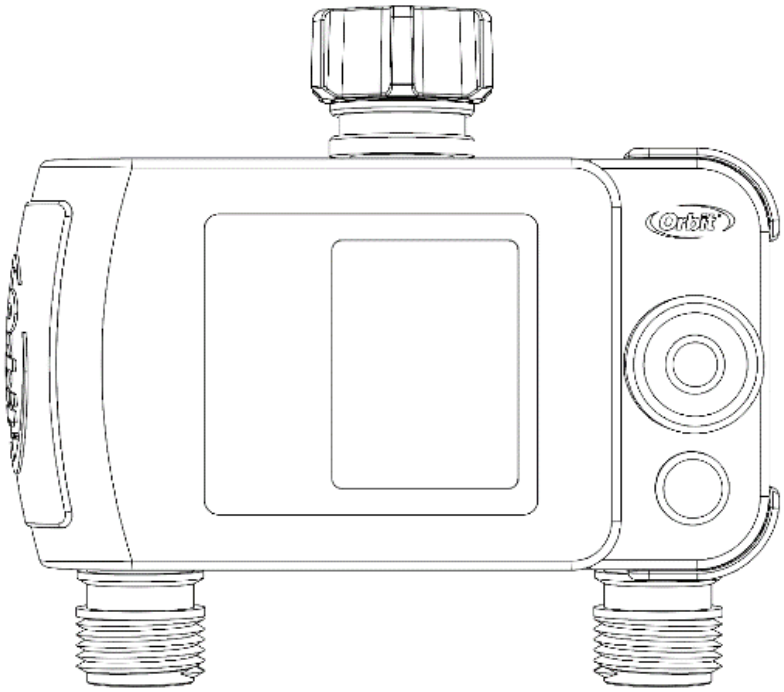
Date: 3/12/20202014/6/2

General Specification GS-8396

Rev: 0

USER MANUAL

HT31BT



CONTENTS

1 INTRODUCTION

1.1 Product Objective

1.1.1 The HT31BT will provide a lineup of B-hyve products that will be capable of control at the device as well as expanded and smart controls through the B-hyve app.

2 GENERAL OVERVIEW AND DESIGN GUIDELINES

2.1 Assumptions / Constraints / Standards

2.1.1 At device interface
2.1.2 Bluetooth connection capabilities
2.1.3 Encoder equipped timer
2.1.4 Device controls
  2.1.4.1 Single start time per port
  2.1.4.2 Intervals: 1 hr, 3 hr, 6 hr, 12 hr, 1 day – 7 day
2.1.5 App controls
  2.1.5.1 Days of the week programming
  2.1.5.2 Smart watering if paired with a hub
2.1.6 At least one season (8 months) of use on a single set of batteries with 5 cumulative cycles per day

3 SYSTEM DESIGN

3.1 System Components

3.1.1 Nordic nRF52833 Bluetooth chipset
3.1.2 Rotary Encoder – 12 position used to select mode, toggle selection, adjust time
3.1.3 Encoder Button – confirms selection
3.1.4 Station Button – switches programming selections between ports (for multiple port timers only)
3.1.5 Valve drive system – reverse flow with latching valve
3.1.6 Solenoid – latching solenoid with reinforcement off pulse
3.1.7 Power system – detects low voltage situations
3.1.8 Segmented LCD provides visual feedback to user

3.2 Device User Interface Inputs/Outputs

3.2.1 Power up/Battery installation
  3.2.1.1 Upon initial power, an “OFF” pulse will be sent to each valve
  3.2.1.2 All settings are cleared and reset
  3.2.1.3 Clock time reset to 1:00 PM
  3.2.1.4 Start times will be cleared
  3.2.1.5 Timer mode will be in the “OFF” state

3.2.2 LCD requirements
- 3.2.2.1 Mode: Positive image
- 3.2.2.2 Type: TN Reflective
- 3.2.2.3 Duty: ¼
- 3.2.2.4 Bias: 1/3
- 3.2.2.5 Segments: 47
- 3.2.2.6 Size 2.5”
- 3.2.2.7 Aspect Ratio: 4:3
- 3.2.2.8 Viewing Direction: 12:00
- 3.2.2.9 Viewing Angle: 45°
- 3.2.2.10 Operating Temperature: -20°C to 70°C
- 3.2.2.11 Storage Temperature: -25°C to 80°C
- 3.2.2.12 Pin connection to PCB

3.2.3 Encoder Requirements
- 3.2.3.1 Index: 12
- 3.2.3.2 Detent Force: Yes
- 3.2.3.3 Push button included

4 ELECTRICAL AND FIRMWARE

4.1 General Electrical Requirements

4.1.1 Input: Nominal 3V with 2X 1.5V AA Alkaline Batteries to power device
- 4.1.1.1 Unit to last a minimum of one watering season on a single set of batteries or equivalent of eight months of normal operation at five watering cycles per day (1500 watering cycles per season)
- 4.1.1.2 Low battery indication at 2.6V (±0.1V) threshold
- 4.1.1.3 Auto valve shut off at 2.4V (± 0.1V) threshold
- 4.1.1.4 Timer will stay powered for 10s after battery removal to replace batteries without losing user settings.
- 4.1.1.5 Follow standard battery fitment guidelines shown where dimension H is determined by only allowing for contact in the correct battery insertion orientation.

4.1.2

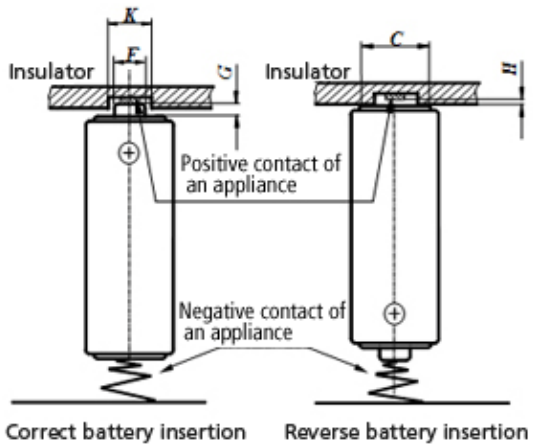


Figure 1 - Battery Tray Design Guideline

4.1.3 PCB conformal coating with UV tracers required

4.1.4 Output Driving Solenoid Pulse

4.1.4.1 Operating Voltage: 19.9 V

4.1.4.2 Pulse Duration: 12mS minimum

4.1.4.3 Behavior: A reinforcement pulse is required when turning the valve off

4.2 General Firmware Requirements

4.2.1 Fast Clock Mode – Device must be able to operate in “fast mode” to allow for accelerated testing (real-time 1min = 1 hour)

4.2.2 Fast clock mode must be initiated using a button configuration (non-compromising of IP rating)

4.2.3 Firmware version will be displayed on powerup during fast clock mode. It will remain visible for 2 seconds.

5 MECHANICAL

5.1 General Workmanship Standard

5.1.1 All units being tested must meet requirements per section 6.4 of QA-60

5.2 Threads

5.2.1 All GHT and BSP threads must meet standard (tested with appropriate go and nogo thread gauge)

5.2.2 Threaded inlet connection will be a brass swivel with TPR overmold

5.3 Environmental Requirements

5.3.1 Maximum operating humidity: 90% RH at 100°F for 24 hours

5.3.2 Operating Temperature: 0°C to 70°C (32°F to 158°F)

5.3.3 Storage temperature: -20°C to 80°C (-4°F to 176°F)

5.3.4 All materials with external surfaces will be UV resistant to withstand outdoor sunlight exposure without fading or material degradation. Reference ASTM G154 for UV resistance benchmarking

5.3.5 Corrosion resistance: Metal components must withstand 24 hours in a 5% salt (NaCl) spray (fog) with no major corrosion or visual (including tarnishing or discoloration) of the components. Reference ASTM B117

5.4 Working Pressure

5.4.1 Valves must function properly at pressures ranging from 10 psi to 100 psi (static) without leakage from internal components and degradation to performance

5.4.2 Valves will open and close cleanly with no degradation to performance under the following pressures: 10 psi, 25 psi, 50psi, 75psi, and 100 psi

5.4.3 Valves will operate at the working pressures while open to atmosphere

5.4.4 Valve will operate at the above conditions restricted with a cap having a 1mm diameter outlet at working pressures

5.5 Proof Pressure

5.5.1 Timer must withstand a static pressure of 150 psi (150% of max working pressure) without suffering catastrophic failure. Valves will meet Working Pressure requirements immediately following Proof Pressure test.

5.6 Burst Pressure

5.6.1 Timer assemblies shall withstand a minimum burst pressure of 700 psi

5.7 Flow Throughput

5.7.1 All valves must meet the following flow requirements to open atmosphere provided the static head:

*Table 1- Minimum Allowable Flow**

Static (PSI)	Min Flow (GPM)
10.0	3.0
25.0	6.0
50.0	8.0
75.0	10.0
100.0	11.5

Note: Test system must have an unrestricted outlet flow capacity exceeding 15 GPM*

5.8 Full Cycle Fuction Testing

5.8.1 The timer must operate properly through the full range of programs. A sampling of programs will be tested for ability to turn on and off properly.

5.9 Product Life

5.9.1 Each valve to reach a minimum of 1,200 cycles by means of actuation at 100 PSI static with a water supply temperature range of 40°F to 80°F

5.9.2 After 1,200 cycles, units will still meet Environmental Requirements and Standard Performance Requirement for Working Pressure.

5.10 Ingress Protection Rating

5.10.1 Valves will have no water ingress onto the PCB or other electrical components and will meet working pressure requirements immediately after being subjected to IPX5 testing. (Reference IEC: 60529 standard)

5.11 Swivel Strength

5.11.1 Swivel will withstand a moment of 200 in*lbs with force direction perpendicular to axis of hose swivel.

5.11.2 Swivel to withstand an axial load of 200lbs

5.11.3 Swivel to withstand being torqued to hose tap fixture to 15in*lbs and be removed without degradation to performance

5.12 Ergonomics

5.12.1 Orbit logo on the valve side will be TPR

5.12.2 Encoder knob will be textured to provide a more ergonomic grip

6 REGULATORY AND SAFETY

6.1 General

6.1.1 Product Must Conform to QA-060, General Workmanship Standard

6.1.2 IEC 60730

7 SIGNIFICANT MODIFICATIONS TO THE GENERAL SPECIFICATION

Date	Rev	Events	Author
3/12/2020	0	For internal use only	BC

*** END ***

FCC Warning

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

-Reorient or relocate the receiving antenna.

-Increase the separation between the equipment and receiver.

-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

-Consult the dealer or an experienced radio/TV technician for help.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

IC Warning

This device complies with Industry Canada’s licence-exempt RSSs. Operation is subject to the following two conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

This equipment complies with ISED radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Cet appareil est conforme aux CNR exemptes de licence d'Industrie Canada . Son fonctionnement est soumis aux deux conditions suivantes :
(1) Ce dispositif ne peut causer d'interférences ; et
(2) Ce dispositif doit accepter toute interférence , y compris les interférences qui peuvent causer un mauvais fonctionnement de l'appareil.

Ce matériel est complété par une exposition de rayonnements ISED pour un environnement naturel. Ce matériel doit être installé et se faire avec une distance minimale de 20cm entre les radiateurs et les autresYour body shop.