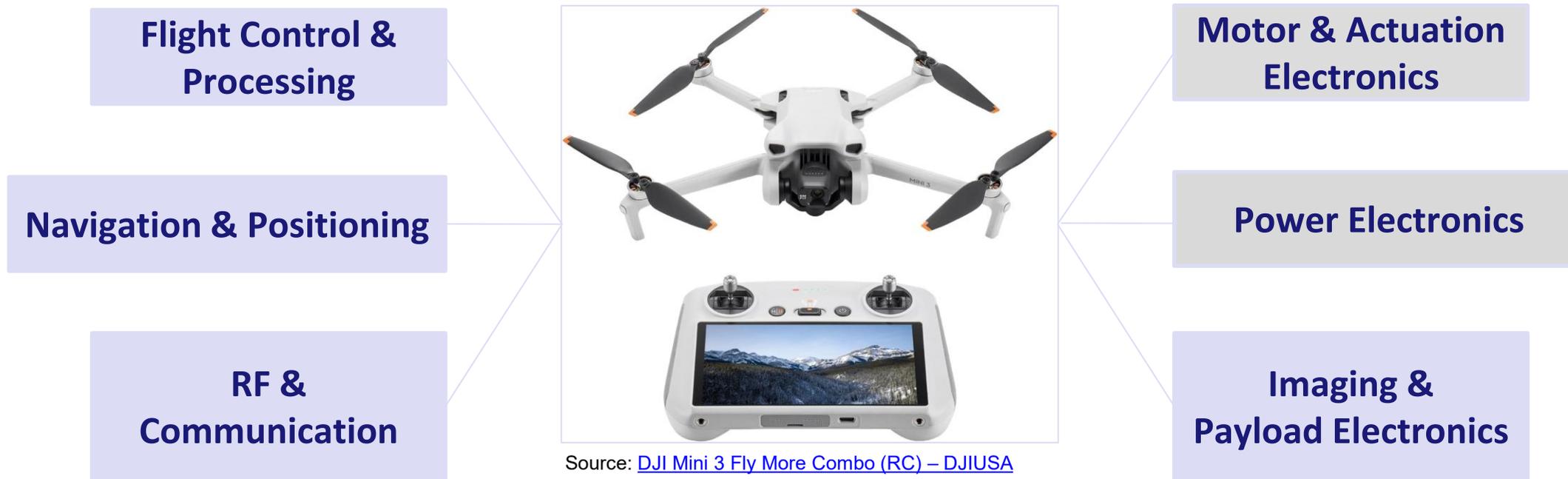


Raltron Solutions for UAV/Drones



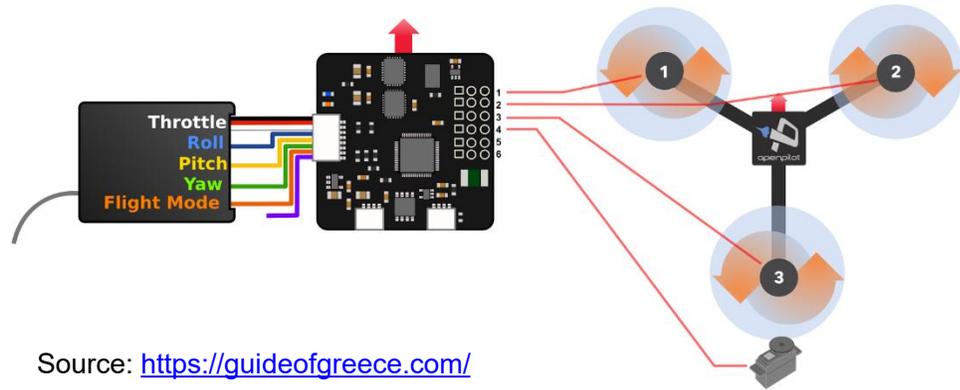
RALTRON

Introduction: What is a UAV/Drone?



A UAV/drone is a lightweight aircraft that stabilizes itself, navigates, and performs mission tasks in real time. It integrates onboard processing, sensing, RF connectivity, and flight control. The diagram summarizes the six core electronics functions; blue blocks indicate where this deck maps Raltron solutions, while gray blocks provide system context.

Flight Control & Processing



Source: <https://guideofgreece.com/>

Core components

- Flight controller MCU
- Flight controller PCB
- IMU interface & sensor fusion pipeline
- Non-volatile memory
- Debug/communications interfaces

Key Raltron Touchpoints

- **MCU/SoC main reference clock:** Crystal
 - Top picks : 8, 16, 24, 32, 40 MHz
- **External clock option** (when an active clock source is preferred): XO (CMOS clock oscillator)
 - Top picks: 16, 24, 25, 32, 40 MHz
- **Low-power timekeeping** (optional RTC domain):
 - 32.768 kHz tuning-fork crystal

Raltron Solutions

Crystals Used in Flight Control & Processing

MHz Crystal

Part #	Size (mm)	Image	Datasheet
RH100	3.2 × 2.5		
R2520	2.5 × 2.0		
R2016	2.0 × 1.6		
R1612	1.6 × 1.2		
R1210	1.2 × 1.0		

Tuning Fork Crystal

Part #	Size (mm)	Image	Datasheet
RT3215	3.2 × 2.5		
RT2012	2.0 × 1.2		
RT1610	1.6 × 1.0		
RT1210	1.2 × 1.0		
RT1210B	1.2 × 1.0 (4 pads)		

Part #	Size (mm)	Frequency	Pads	Load Capacitance (pF)	Image	Datasheet
RH100-16.000-12-1020-EXT-TR-NS2	3.2 × 2.5	16.000 MHz	4	12		
RH100-24.000-8-1020-EXT-TR-NS1	3.2 × 2.5	24.000 MHz	4	8		
RH100-32.000-10-F-1020-X-T-NS1	3.2 × 2.5	32.000 MHz	4	10		
RT3215-32.768-12.5-TR	3.2 × 1.5	32.768 kHz	2	12.5		



Raltron Solutions

XO used in Flight Control & Processing

Clock Oscillator MHz

Part #	Size (mm)	Image	Datasheet
COM2	5.0 × 3.2		
COM1	3.2 × 2.5		
CO2520	2.5 × 2.0		
CO2016	2.0 × 1.6		
CO1612	1.6 × 1.2		

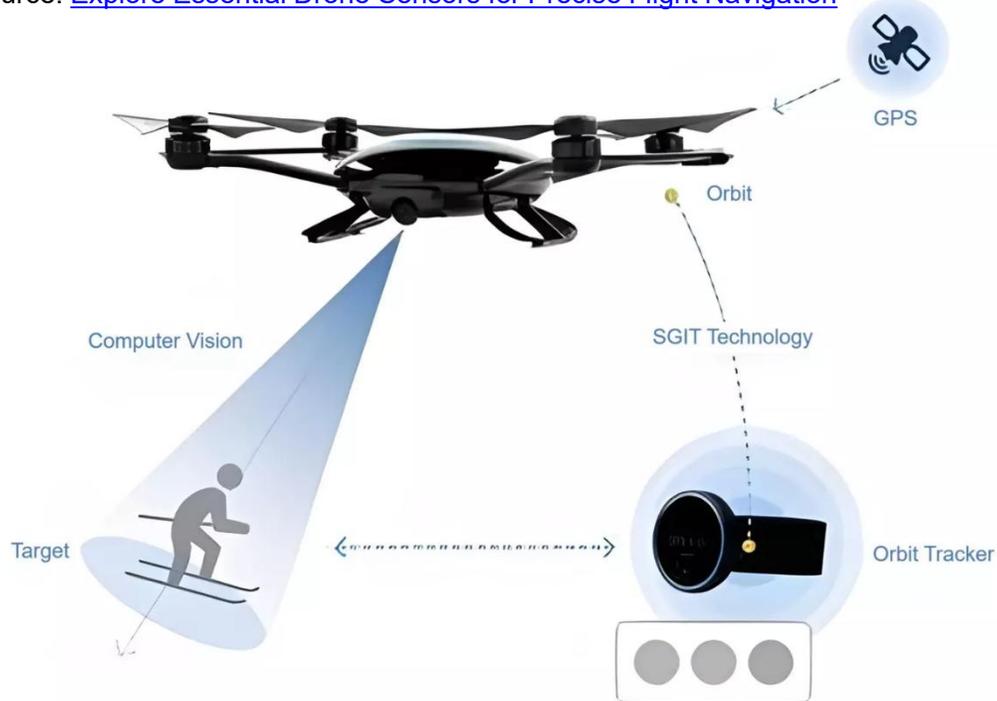
COM1305/CO2520/2016 Series (more compact XO footprint examples)

Part #	Size (mm)	Frequency (MHz)	Supply Voltage (V)	Stability (ppm)	Image	Datasheet
COM1305-25.000-EXT-T-TR	3.2 × 2.5	25.000	3.3	50		
CO2520-25.000-3.3-50-X-T-TR	2.5 × 2.0	25.000	3.3	50		
CO2016-25.000-3.3-50-X-T-TR	2.0 × 1.6	25.000	3.3	50		



Navigation & Positioning

Source: [Explore Essential Drone Sensors for Precise Flight Navigation](#)



Navigation & Positioning provide the **drone's location and motion estimate**: GNSS delivers absolute position, velocity, and time, while onboard sensors (IMU and environmental sensors) help estimate attitude and altitude for stable navigation and mission execution.

Core components

- GNSS module
- GNSS antenna
- IMU, magnetometer
- Barometer
- Optical flow / ToF / LiDAR

Key Raltron Touchpoints

Timing / Frequency Reference

- GNSS reference oscillator: 26.000 MHz TCXO
- Optional frequency steering: 26.000 MHz VCTCXO
- GNSS backup timekeeping: 32.768 kHz tuning-fork

RF Front-End (GNSS)

- L1 pre-filtering: 1575.42 MHz SAW filter

Antennas

- GNSS L1 patch antenna : 1575.42 MHz

Raltron Solutions

TCXO/VTXCO/OCXO used in Navigation & Positioning

TCXO (26 MHz GNSS reference)

[TCXO Products - Raltron](#)

Part #	Size (mm)	Frequency (MHz)	Supply Voltage (V)	Stability (ppm)	Image	Datasheet
RTX-2016AD333-S-26.000-TR	2.0 × 1.6	26.000	3.3	±0.5		
RTX-2520AD31-S-26.000-TR	2.5 × 2.0	26.000	1.8	±0.5		

VCTCXO (26 MHz, when frequency steering / calibration is needed)

[RTV-2016 - Raltron](#)

[RTV-2520 - Raltron](#)

Part #	Size (mm)	Frequency (MHz)	Supply Voltage (V)	Stability (ppm)	Image	Datasheet
RTV-2016AF310-S-26.000-TR	2.0 × 1.6	26.000	1.8	±0.5		
RTV-2520DF321-S-26.000-TR	2.5 × 2.0	26.000	1.8~3.3	±0.5		

OCXO (10 MHz, optional high-stability timing/holdover)

[OCXO Products - Raltron](#)

Part #	Size (mm)	Frequency (MHz)	Supply Voltage (V)	Stability (ppm)	Datasheet
OX4570A-D3-2-10.000-3.3	9.7 × 7.5 × 4.0	10.000	3.3	±0.02	
OX4114A-D3-1-10.000-3.3	14.6 × 9.7 × 7.0	10.000	3.3	±0.01	



Raltron Solutions

GPS Antennas used in Navigation & Positioning

Passive L1 SMD GNSS Patch Antennas (External LNA Required)

[RPA Patch Antennas - Raltron](#)

Part #	Size (mm)	Frequency (MHz)	Image	Datasheet
RPA-PB0-1212-JK-004	12 x 12	1575.42 ±1.023		
RPA-PB0-1212-RT-001	12 x 12	1575.42		
RPA-PB0-1212-JK-003	12 x 12	1575.42 ±1.023		
RPA-PB0-1515-G-003	15 x 15	1575.42 ±2.5		
RPA-PB0-1515-JK-001	15 x 15	1575.42 ±1.023		
RPA-PB0-2525-J-003	25 x 25	1575.42 ±1.023		

Active L1 GNSS Patch Antennas (Integrated LNA)

Part #	Size (mm)	Frequency (MHz)	Image	Datasheet
RPA-PB0-9090-O-IN-001	9 x 9	1575.420 ±2		
RPA-PB0-1010-O-IN-001	10 x 10	1575.420 ±2		
RPA-PB0-A-1818-GE-001	18 x 18	1575.42 ±3		



Raltron Solutions

GPS Saw Filters used in Navigation & Positioning

GPS L1 Saw Filter(1575.42 MHz): Standard civilian band used in virtually all drones

[SAW Filters - Raltron](#)

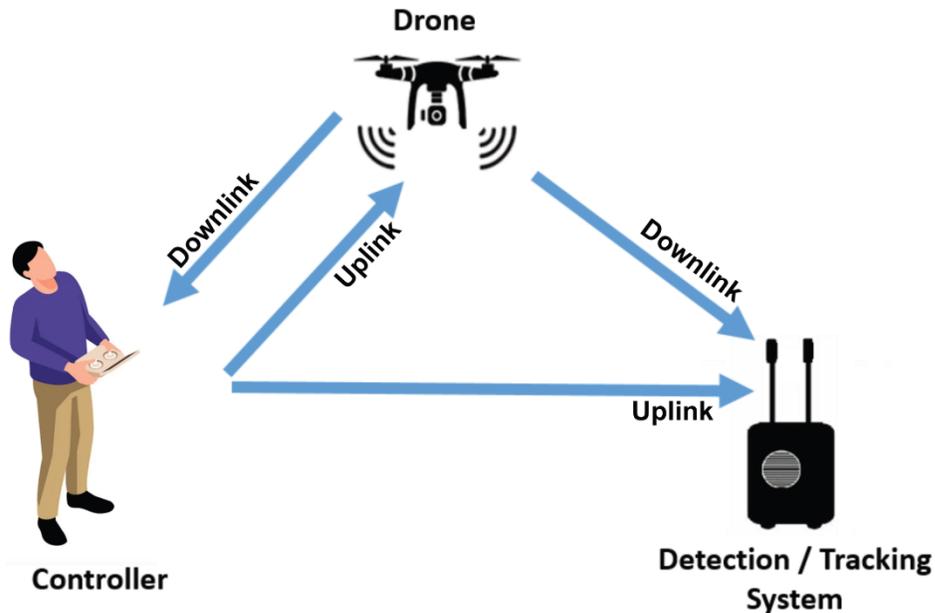
Part #	Size (mm)	Frequency (MHz)	Insertion Loss (dB)	Pass Band (kHz)	Image	Datasheet
RSF-1575.420-2400-1411-TR-NS2	1.4 x 1.1	1575.42	0.9/1.3	2400		

GPS L5 Saw Filter(1176.45 MHz): Newer band with better multipath performance and accuracy in advanced receivers

Part #	Size (mm)	Frequency (MHz)	Insertion Loss (dB)	Pass Band (kHz)	Image	Datasheet
RSF-1176.450-20460-1109-TR	1.1 x 0.9	1176.45	1.2/1.6	20460		



RF & Communication



Source: [Drone Detection and Tracking Using RF Identification Signals](#)

RF & Communication Electronics provide the drone's links to the outside world: command/control, telemetry, and (in many platforms) high-bandwidth video. It must maintain reliable TX/RX performance under interference, vibration, and fast movement.

Core components

- RF transceiver / modem
- Video transmission module
- RF front-end: PA, LNA, RF switch
- Matching network + front-end filtering
- Antenna system + RF connectors/cable

Key Raltron Touchpoints

Timing / Frequency Reference

- **16 MHz** or **26 MHz** reference crystals used in 2.4 GHz control transceivers
- **32 MHz** reference crystal used in Sub-GHz long-range telemetry
- **40 MHz** crystal used in Wi-Fi / digital links
- **26 MHz TCXO** used in Cellular/LTE links

RF Filters

- **2.4 GHz ISM** band filtering
- **5/5.8 GHz** class filtering
- Sub-GHz filtering for **868/915 MHz** telemetry bands

Antennas

- **2.4/5.8 GHz** dual-frequency transmission for common use
- **433/868/915/2.4 GHz** bands for Long-range RC/telemetry

Raltron Solutions

MHz Crystals/TCXO/VTXCO used in RF & Communication

MHz Crystals (compact footprints common in RF modules; 2.0×1.6 mm)

[R2016 Series - Raltron](#)

Part #	Size (mm)	Frequency (MHz)	Pads	Load Capacitance (pF)	Image	Datasheet
R2016-16.000-10-1015-TR-NS1	2.0 × 1.6	16.000	4	10		
R2016-26.000-10-F-1010-TR	2.0 × 1.6	26.000	4	10		
R2016-32.000-10-F-1020-EXT-TR	2.0 × 1.6	32.000	4	10		
R2016-40.000-6-F-1010-TR-NS1	2.0 × 1.6	40.000	4	6		

TCXO / VCTCXO (26 MHz for cellular/LTE links; higher stability reference)

[Temperature Compensated Oscillators - Raltron](#)

Part #	Size (mm)	Frequency (MHz)	Supply Voltage (V)	Stability (ppm)	Image	Datasheet
RTX-2016AD333-S-26.000-TR	2.0 × 1.6	26.000	3.3	±0.5		
RTV-2016AF310-S-26.000-TR	2.5 × 2.0	26.000	1.8	±0.5		



Raltron Solutions

LTCC Filters & Antennas used in RF & Communication

LTCC Filters (front-end filtering)

[LTCC Filters - Raltron](#)

Part #	Size (mm)	Frequency (MHz)	Operating Temperature (°C)	Image	Datasheet
RCF-2450.000-100000-1608-W-TR	1.6 x 0.8	2400~2500	-40 ~ +85		
RCF-5500.000-700000-1005-W-001	1.0 x 0.5	5150~5850	-40 ~ +85		
RCF-868.000-20000-2012-W-TR-001	2.0 x 1.25	858~870	-40 ~ +85		
RCF-829.000-262000-1608-W-TR	1.6 x 0.8	698~960	-40 ~ +85		

Stub Antennas & PCB Antenna

[RST Stub Antennas - Raltron](#)

[RPC PCB Antennas - Raltron](#)

Part #	Size (mm)	Frequency (MHz)	Gain (dBi)	Image	Datasheet
RST-W2-P-67-SMA-G	87.5 x 7.8 + 20.5 x 10	2400~2500 / 5150 ~5725	1.5		
RPC-W2A1-330172-O-E-001	33 x 17.2	2400~2500	3		
RPCF-MA11-3308-O-A-001	33 x 8 x 0.2	868	2.15		
RPCF-MB5-3308-O-A-001	33 x 8 x 0.2	915	2.15		



Raltron Solutions

Chip Antennas used in RF & Communication

2.4–5.8 GHz class (Wi-Fi / BT / dual-band link)

[RCA Chip Antennas - Raltron](#)

Part #	Size (mm)	Frequency (MHz)	Gain (dBi)	Image	datasheet
RCA-6050-L1-TR	5.9 x 5.1 x 1.1	2450/5250/5850	4		
RCA-6050-L0L1-TR	5.9 x 5.1 x 1.1	2450/5250/5850	4 (peak)		

Dual-band wide (2.4 GHz + 5 GHz up to 7.15 GHz)

Part #	Size (mm)	Frequency (MHz)	Gain (dBi)	Image	datasheet
RCA-W6A7-2012-W-001	8.0 x 1.0 x 1.1	2400~2500 / 5150 ~5725	1.5 / 4.5		

5 GHz / 5.8 GHz only

Part #	Size (mm)	Frequency (MHz)	Gain (dBi)	Image	datasheet
RCA-MA11-1204-G-002	87.5 x 7.8 + 20.5 x 10.0	868	2.63 (Peak)		
RCA-W1A8-1204-Z-002	12.0 x 4.0 x 1.6	870	1.67 (Peak)		
RCA-MB5-1204-G-001	12.0 x 4.0 x 1.6	915	3.42 (Peak)		
RCA-MB5-1204-Z-TR-002	12.0 x 4.0 x 1.6	915	1.59 (Peak)		



Imaging & Payload



Source: [FREEFLY MAPPING PAYLOAD FOR ASTRO DRONE](#)

Imaging & Payload Electronics enable the drone's mission output (video capture, inspection, mapping, sensing). This block acquires sensor data (camera/payload), processes or stabilizes it (ISP/encoder/gimbal), and transmits payload data over a dedicated RF link.

Core components

- CMOS image sensor + camera interface
- ISP / encoder
- Video link module + RF front-end + antenna
- Gimbal controller
- Payload compute

Key Raltron Touchpoints

Timing / Frequency Reference

- Camera sensor reference clock (XCLK): commonly **24 MHz**
- Analog 5.8 GHz VTX PLLs: **8 MHz** oscillator/crystal clock

RF Filters

- **5.8 GHz** video downlink band
- Many HD FPV systems are dual-frequency **2.4/5.8 GHz**

Antennas

- **5.8 GHz** antennas for payload video links
- Optional **2.4/5.8** dual-band antennas for dual-frequency systems

Raltron Solutions

MHz Crystals used in Imaging & Payload

24 MHz camera clock source (XCLK)

[R2016 Series - Raltron](#)
[RH100 Series - Raltron](#)

Part #	Size (mm)	Frequency (MHz)	Pads	Load Capacitance (pF)	Image	Datasheet
R2016-24.000-9-1015-EXT-TR-NS4	2.0 × 1.6	24.000	4	9		
RH100-24.000-8-1020-EXT-TR-NS1	3.2 × 2.5	24.000	4	8		

25.000 MHz (common in payload interfaces)

[R1612 Series - Raltron](#)

Part #	Size (mm)	Frequency (MHz)	Pads	Load Capacitance (pF)	Image	Datasheet
R1612-25.000-9-F-1010-TR	1.6 × 1.25	25.000	4	9		
RH100-25.000-10-F-1010-EXT-TR	3.2 × 2.5	25.000	4	10		

25.000 MHz (common in embedded/payload stacks)

Part #	Size (mm)	Frequency (MHz)	Pads	Load Capacitance (pF)	Image	Datasheet
R1612-26.000-8-F-2020-EXT-TR	1.6 × 1.25	26.000	4	8		
RH100-26.000-10-F-1010-EXT-TR	3.2 × 2.5	26.000	4	10		



Raltron Solutions

LTCC filters and Antennas used in Imaging & Payload

RF bandpass filters (payload video link bands)

[Microwave Filters - Raltron](#)

Part #	Size (mm)	Frequency (MHz)	Operating Temperature (°C)	Image	Datasheet
RCF-2450.000-100000-1608-W-TR	1.6 x 0.8	2400~2500	-40 ~ +85		
RCF-5500.000-700000-1005-W-001	1.0 x 0.5	5150~5850	-40 ~ +85		

Antennas (payload video link)

[RST Stub Antennas - Raltron](#)

Part #	Size (mm)	Frequency (MHz)	Gain (dBi)	Image	Datasheet
RST-W5A1-20022-17M-TE-001	Ø22 x 200	4900~5900	5		
RST-W2A2-19613-O-001	Ø13 x 196 ±3	2400~5800	4		
RST-W2A2-22-G-001	Ø6.9 x 195 ±2	2400~5800	5		



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