Key Features of the RCV/RCR-2D, 2DL & 2DP

1 Environmental (all versions)
> Designed to meet AEC-Q100 & RTCA DO-160 D~G.
> Operating temperature from -40 to +65 °C.
> Lightest in its class for tight weight & balance budgets.

2 Operating Features 2DL (latching version)
> Can operate with legacy standard remote bipolar pulsing controllers with 25ms. or longer pulsing.
> Internal pulsing controller operates with simple DPDT contact toggle switch wired in a bipolar-bridged mode.
> 25ms. with ~350ma. maximum pulse to toggle between on/off states.
> Remembers on/off states without power.
> Active idle/post pulsed on and off state @ <50ma. Suitable for use on an emergency battery circuit bus.

3 Operating Features 2D (non latching version)
> Simple on/off control via. a SPST contact toggle switch.
> Positive valve turn off in low supply voltage faults @ ~8V
> Direct replacement for existing electrically controlled valves.
> 25ms. ~350ma. maximum pulse for kick-on then sustain at <50ma. only during the steady power on state. Suitable for use on emergency battery circuits.

4 Electrical (2D & 2DL)
> Automatic for 11 to 28 VDC on/off operating range.
> Analog circuitry eliminates RFI noise & EMI.
> about 25ma. LED current during on & off states for supervisory status in smart power bus management systems
> Simple wiring interface via a DE-09 connector
> 4-20 ma. remote cylinder pressure gauge (FS: 0-3,000 psig.)
> 1-5 Volt cylinder pressure gauge optionally available
> Requires shielded 22 to 24 AWG MIL-C-27500 wiring, 2 wires for valve only, or 4 wires for valve and pressure gauge.

5 Pneumatic Performance (all versions)
> Operational with inlet pressures from 35 to 2,500 psig.
> Accommodates two crew SCBA-type Quick-Don masks.
> Accommodates medical emergency respirator system.
> Positive operations down to inlet pressures of 20 psig.

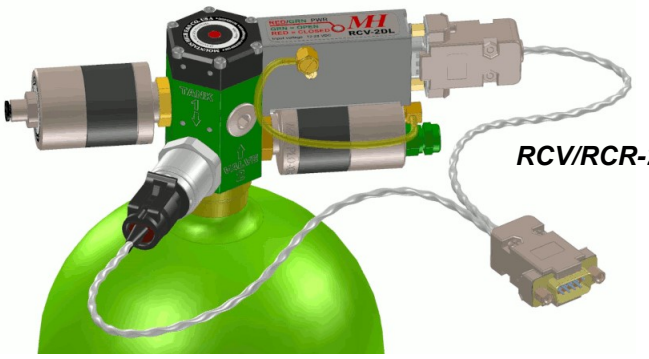
6 Threads & Mounting (all versions)
> Coaxial SAE-8 external and -4 internal main inlet ports for direct to cylinder or remote from cylinder inlet options.
> All service ports are straight-thread SAE-4 O-ring type sealing needing no sealing paste or tapes.
> JIC type fittings can also be used.

7 Gas Compatibility (all versions)
> Can be used with Oxygen, Nitrogen, CO_2, Air. ***Not compatible with acidic, corrosive or hydrocarbon gases***.

8 Servicing & Overhaul (all versions)
> Simple design allows for affordable maintenance and overhauls. All standard hardware and O-rings, no special molded polymer diaphragms or seals.

General Details of the RCV/RCR-2D, 2DL and 2DP

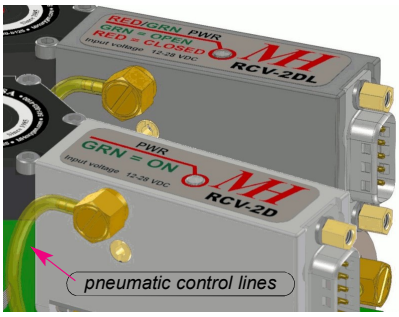
The RCV/RCR-2Dx series are fully featured remotely-controlled oxygen management valve & regulator combo systems. They have descended from the original RCV/RCR that has provided over 28 years of on-going improvements and airborne service in many experimental, air ambulance, specialized mission and certified aircraft.



RCV/RCR-2DL

The 2D & 2DL are specially designed for low electrical power operations and if required, can be installed in a non pressurized section of the aircraft. These units have a unique double action, visible on the top, pop-up valve to open and close the main valve for a full positive on/off control over a wide range of supplied inlet pressures.

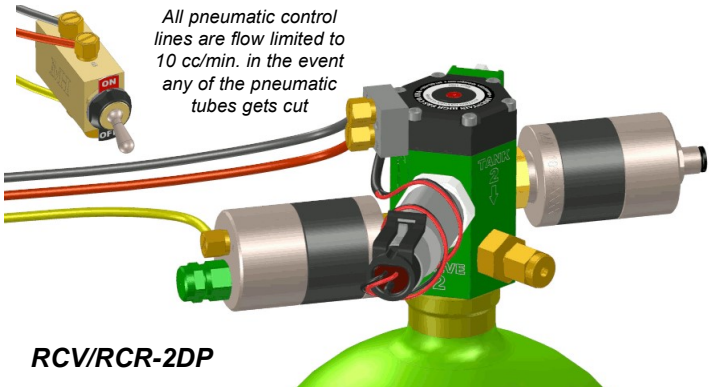
The 2D is a direct operational replacement to our legacy simple on/off 12 and 28 volt DC powered RCV/RCR unit. The main valve, in the hex body, opens upon the application of the applied DC voltage and closes when removed.



The 2DL and 2D have the exact same mechanical form-factor. The manifolds have different labels and operating behavior as set by the installed controller

All pneumatic control lines are flow limited to 10 cc/min. in the event any of the pneumatic tubes gets cut

The 2DP (below) is all pneumatically controlled via a remotely placed, manually-operated pneumatic toggle control switch. A user supplied electro-pneumatic valve could be used in place of a toggle switch.



RCV/RCR-2DP

RCV & RCV/RCR Terminology & Features

The term RCV pertains to the hex valve body with the service-pilot regulator and controller manifold that serve as a remotely controlled valve for managing pressurized gases directly from a cylinder or connected gas source.

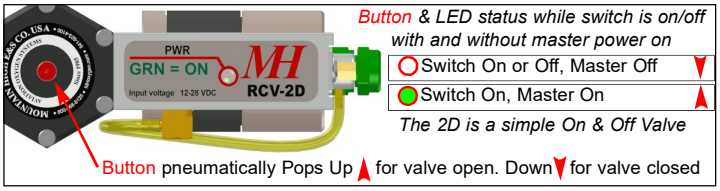
The term RCV/RCR pertains to an RCV outfitted with one or more servicing regulators attached to the upper set of 3 SAE-4 O-ring sealed straight-threaded accessory ports and now serves as a RCR (Remotely Controlled Regulator).

The RCV/RCR-2DL can be a direct replacement for most 12 & 28 VDC latching valve regulators operated by a bi-polar latching controllers. If the RCV-2DL is to be used with an existing bi-polar pulsing controller, make sure the pulse length is at least 1/3 of a second or longer for the on/off events to operate properly.

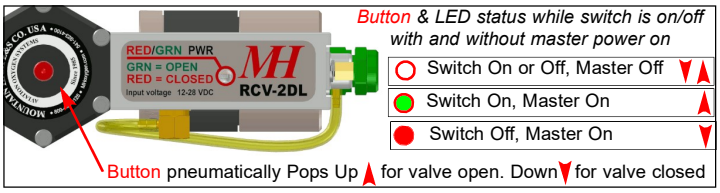
RCV/RCR Control Behavior & Status Indicators

The RCV/RCR-2D & 2DL has two diagnostic status indicators. 1; The LED on the control manifold. 2; The red pop-up valve button on the top of the RVC body. Note: The pneumatically driven main valve on the RCV can only move the red indicator button, up or down, in response to the on/off switch only while O2 or air pressure is supplied. Otherwise it will remain in the last moved position when the supply is depleted. This will come in handy during initial installation and any future trouble shooting.

The **RCV/RCR-2D** LED control legend is green for power applied where the pilot valves pneumatically drive the red main valve button up allowing the supply gas to flow. Not illuminated, for no power, the pilot valves pneumatically drive the main valve button down turning off the supply of gas. A simple SPST on/off method.

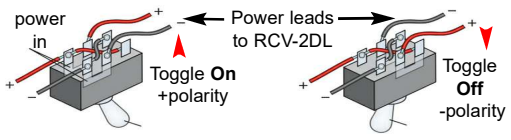


The **RCV/RCR-2DL** LED valve open legend is the same as the 2D version. However, if power is interrupted or master turned off while the control DPDT switch is on, the LED goes dark, but the main valve remains latched open and the red RCV valve button up. Once power is resumed and if the control switch has been kept on, the green LED lights again and the pilot valves reaffirm the open status. The opposite is true if the control switch left off. The control switch alternates power polarity for on/off operations.



The RCR/RCV-2D uses a simple SPST ON/Off Switch and a direct replace for the original RCR/RCV without wiring changes

Example on an on/off control switch for the 2DL



Pressure and Flow Details of the RCV-2Dx

The RCV-2Dx is a fully qualified high-pressure valve for containing and managing gas pressures from a cylinder or other source as high as 2,500 psig. A large diameter inlet over-seat type valve is mechanically opened & closed by an automatically scaled & limited force ratio (~12:1) pneumatic piston. This allows for a much smaller pneumatic pressure (15psig.) to open and close the valve on a full cylinder while mitigating wear on the main inlet valve seat. A high-stability, dual-stage, low-flow/pressure (pilot/service regulator) supplies about 15 psig. to a set of low power electro-pneumatic two-way pilot-valves that apply differential pressures on the control piston of the main valve in a dual push/pull action. The net effect is that about 1/12 of electrical power is needed to control the main valve that would otherwise require much more energy to control the pressure forces.

The symmetrical dual-acting, push/pull electro-pneumatic valve system of the RVC-2D is fully operational down to inlet pressures of 20 psig. through 2,500 psig. allowing for full operation of the main valve with an inlet pressures of 20 psig. This allows for full control of the RCV valve while the supply may be inadequate for the items it is servicing. Good for hot-swap cylinder installations.

Considerations for High-Flow Requirements

The RCV-2Dx has open flow rates high enough to accommodate a full medical emergency respirator system or two SCBA-class Quick-Don crew mask systems and a four-place passenger drop mask system down to an inlet pressure of 150 psig. This is assuming that each of the quick-don masks has its own primary reducing regulator as with the (Eros® type MF20-534 or a TSO equivalent) Quick-Don system. The RCV-2D and 2DL versions are well suited for air ambulance medical respirators and a series of constant-flow adjustable thorpe-tube flowmeters.

Installation and Operating Considerations

As with any oxygen valve, if the RCV is used with SCBA class Quick-Don masks or medical respirators and is to be remotely mounted from the tank, the inlet piping must be no smaller than 3/8” dia. and a distance no more than 24”. This also applies if the outlet of the RCV is to be piped at a distance. The use of an end point accumulator is advised in these situations where more distance from the source is required.

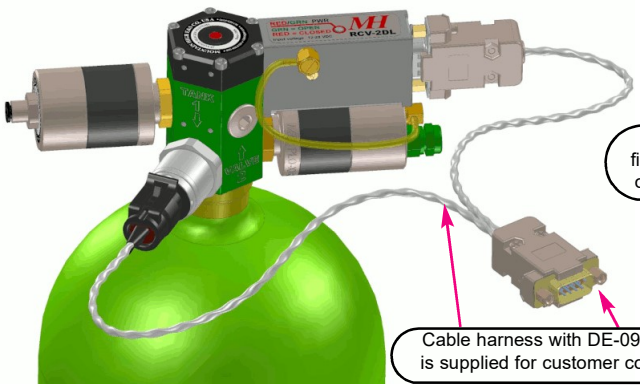
Optional RCV & RCV/RCR Configurations

The RCV-2DL and 2D versions operate from a DC voltage of 12 to 28 VDC. The RCV-2DL only can be optionally ordered with valves to operate with 48-volt systems. The RCV-2D does not have this option.

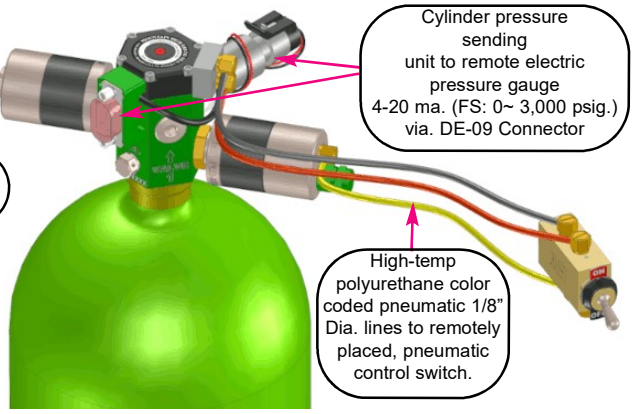
MH can provide primary service reducing regulators for crew mask or respirator systems and set to custom pressure as an option. The RCV-2DL requires a simple two-wire bipolar DC power signal for on/off operations and the RCV-2D uses a two-wire unipolar DC power for the on/off operations.

The RCV/RCR configurations are cataloged for simple single item number ordering. However, other configurations, such as multiple regulators at various outlet pressures, can be accommodated upon ordering. ***This and our other products are designed and produced by MHO in the USA.***

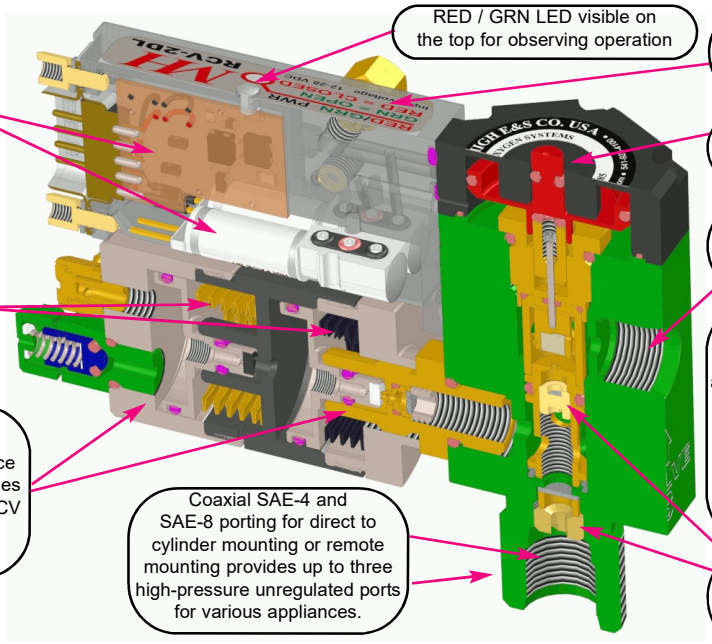
RCV/RCR-2D & 2DL



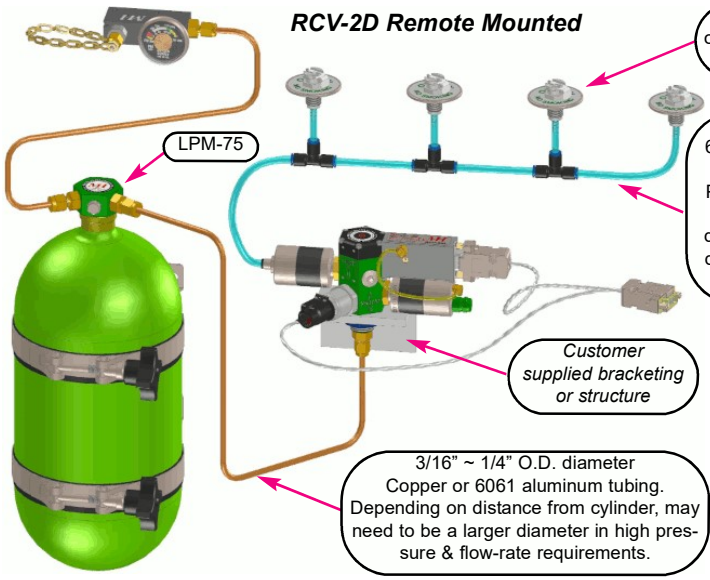
RCV/RCR-2DP



For further details, refer to the operating and installation manuals for the various items



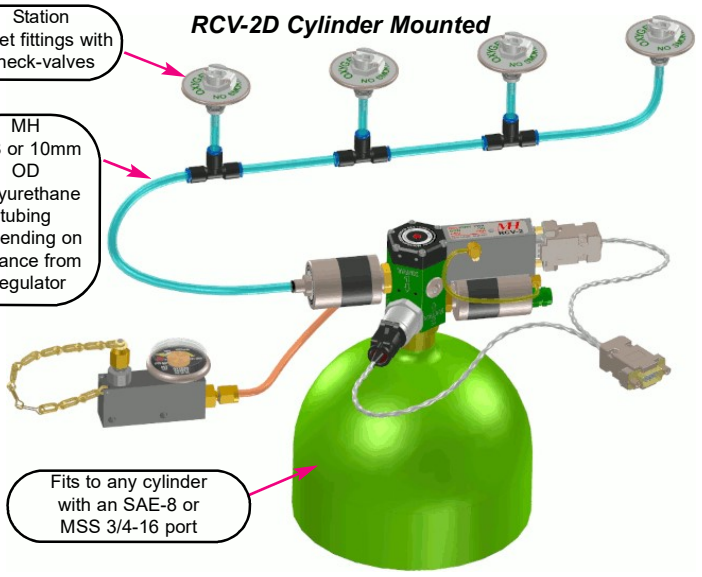
RCV-2D Remote Mounted



Station outlet fittings with check-valves

MH 6, 8 or 10mm OD Polyurethane tubing depending on distance from Regulator

RCV-2D Cylinder Mounted



For further details, refer to the operating and installation manuals for the various items discussed

Some of the pages in this document were taken from the operating & installation manual and may not be the latest revision.

Applications include

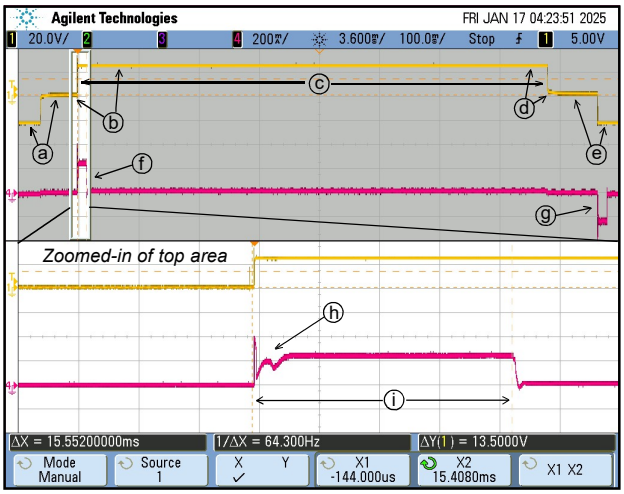
> Aviation breathing for non and partial pressurized aircraft
> Air Ambulance oxygen management
> Space & launch systems
> Industrial pneumatic control
> Pneumatic door & window control systems

Item Weights (rounded-up)	**grams (Oz)**
RCV/RCR-2D & DL with one dual-stage service regulator & wire harness	507.8 (18)
SAE-4 Dual-Stage service regulator with standard push-in poly-tube connector	95.7 (3.4)
V1 SAE-4 Inlet pressure sending unit; 4-20 ma.	55 (2)
SAE-4 port plugs each	2.4 (0.09)
Wire harness kit	44.5 (1.6)
1/8” or 3/16” Compression Fitting	23.6 (0.83)
RCV/RCR-2DL cmplt. config. w 2-stage pilot & service regs, sending unit fill & plugs & wire-harness	571.5 (20.1)

Recommended Operation Conditions	**Min**	**Max**	**Units**
Operating Voltage	+11	+28	VDC
Power-on/off slew-rate (soft-starting managed power bus)	120 mV	N/A	per ms.
Power on to off hysteresis difference from initial power on	-2.5	-3	VDC
Operating Temperature	-30	+65	°C
Operating inlet pressure	50	2,500	PSIG

Absolute Operation Limits	**Min**	**Max**	**Units**
Operating Voltage	+10	+48	VDC
Operating Temperature	-40	+65	°C
Operating inlet pressure (*on/off control of RCV only)	* 10	2,500	PSIG
Operating Current 2D & 2DL (On @ idle / Pulsing On)	~30	~650	ma.
Max flow through valve system @ 1800 psig in. at full on/off cycling		~500	LPM

Oscillscope electrical details of the RCV/RCR-2DL

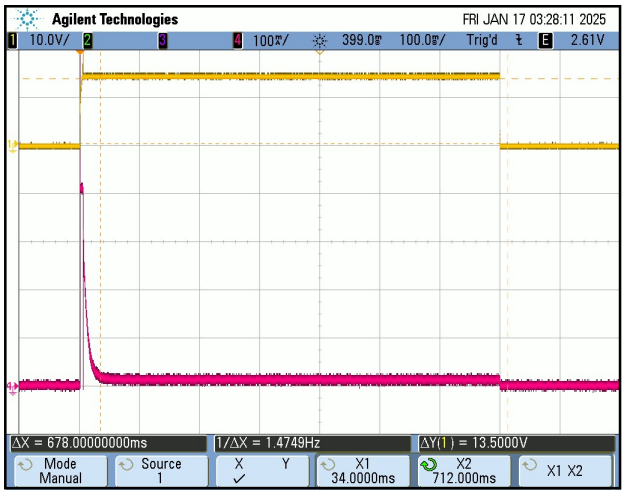


As the control switch is changed from off to on position (a-b & f), a bipolar voltage transitions from -24 through 0V then +24V applied to the RCV-2DL from. The control switch MUST have non shorting-contacts (break-before-make) in order to provide a zero voltage dwell-time for the internal strobe to reset and trigger current pulses (f & g) for the pilot valves to toggle. Changing the control switch to the off position produces a reverse 'strobe' signal for the pilot valves to off (d-e & g).

A reduced strobe-on duration (i) of ~13 ms. @ 28V for power factoring is automatically applied as a function of input voltage. The latching pilot valves produce a current feed back while shuttle latching on and off (h). Therefore after the initial strobe on/off current pulse with power being applied, there is no current drawn by the pilot valves during the on/off steady states while power is applied. There is however, a supervisory current draw of 50ma. of less from the status RED/GRN LEDs.

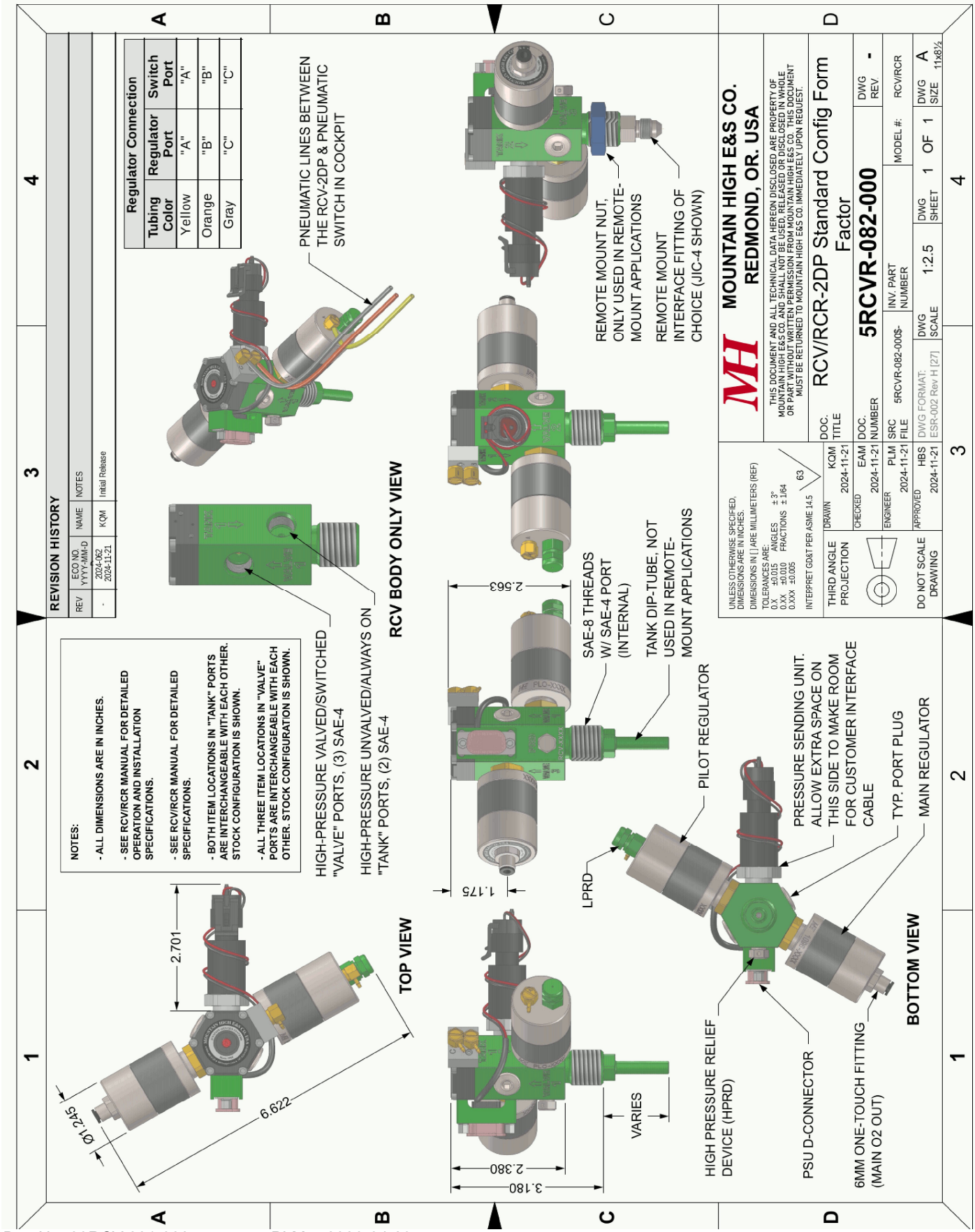
Note
If a power management system is programmed to provide the alternating (bi-polar) power to toggle operate the RCV/RCR-2DL from off-to-on and vise-versa, it must have a zero voltage dwell-time of about 50 ms. or greater between the on-off polarity changes in order for the RCV/RCR-2DL to produce the needed pilot valve strobe. Going directly from a no-power-applied state to on or off is sufficient for the strobe to be produced.

Oscillscope electrical details of the RCV/RCR-2D



DRAFT SPECS & DETAILS ARE UNDER REVIEW & IN PROGRESS

Example control panel scenarios


REVISION HISTORY
REV | ECO NO. YYYY-MM-D | NAME | NOTES
- | 2024-062 2024-11-21 | KQM | Initial Release
Regulator Connection
Tubing Color | Regulator Port | Switch Port
Yellow | "A" | "A"
Orange | "B" | "B"
Gray | "C" | "C"
NOTES:
- ALL DIMENSIONS ARE IN INCHES.
- SEE RCV/RCR MANUAL FOR DETAILED OPERATION AND INSTALLATION SPECIFICATIONS.
- SEE RCV/RCR MANUAL FOR DETAILED SPECIFICATIONS.
- BOTH ITEM LOCATIONS IN "TANK" PORTS ARE INTERCHANGEABLE WITH EACH OTHER. STOCK CONFIGURATION IS SHOWN.
- ALL THREE ITEM LOCATIONS IN "VALVE" PORTS ARE INTERCHANGEABLE WITH EACH OTHER. STOCK CONFIGURATION IS SHOWN.
TOP VIEW
2.701
Ø1.245
6.622
HIGH-PRESSURE VALVED/SWITCHED "VALVE" PORTS, (3) SAE-4
HIGH-PRESSURE UNVALVED/ALWAYS ON "TANK" PORTS, (2) SAE-4
RCV BODY ONLY VIEW
PNEUMATIC LINES BETWEEN THE RCV-2DP & PNEUMATIC SWITCH IN COCKPIT
2.563
1.175
SAE-8 THREADS W/ SAE-4 PORT (INTERNAL)
TANK DIP-TUBE, NOT USED IN REMOTE-MOUNT APPLICATIONS
REMOTE MOUNT NUT, ONLY USED IN REMOTE-MOUNT APPLICATIONS
REMOTE MOUNT INTERFACE FITTING OF CHOICE (JIC-4 SHOWN)
3.180
2.380
VARIES
LPRD
PILOT REGULATOR
PRESSURE SENDING UNIT. ALLOW EXTRA SPACE ON THIS SIDE TO MAKE ROOM FOR CUSTOMER INTERFACE CABLE
TYP. PORT PLUG
MAIN REGULATOR
HIGH PRESSURE RELIEF DEVICE (HPRD)
PSU D-CONNECTOR
6MM ONE-TOUCH FITTING (MAIN O2 OUT)
BOTTOM VIEW
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES.
DIMENSIONS IN [ ] ARE MILLIMETERS (REF)
TOLERANCES ARE:
0.X ±0.015 ANGLES ±3°
0.XX ±0.010 FRACTIONS ±1/64
0.XXX ±0.005
INTERPRET GD&T PER ASME 14.5
63
THIRD ANGLE PROJECTION
DRAWN KQM 2024-11-21
CHECKED EAM 2024-11-21
ENGINEER PLM 2024-11-21
APPROVED HBS 2024-11-21
DO NOT SCALE DRAWING
MOUNTAIN HIGH E&S CO.
REDMOND, OR. USA
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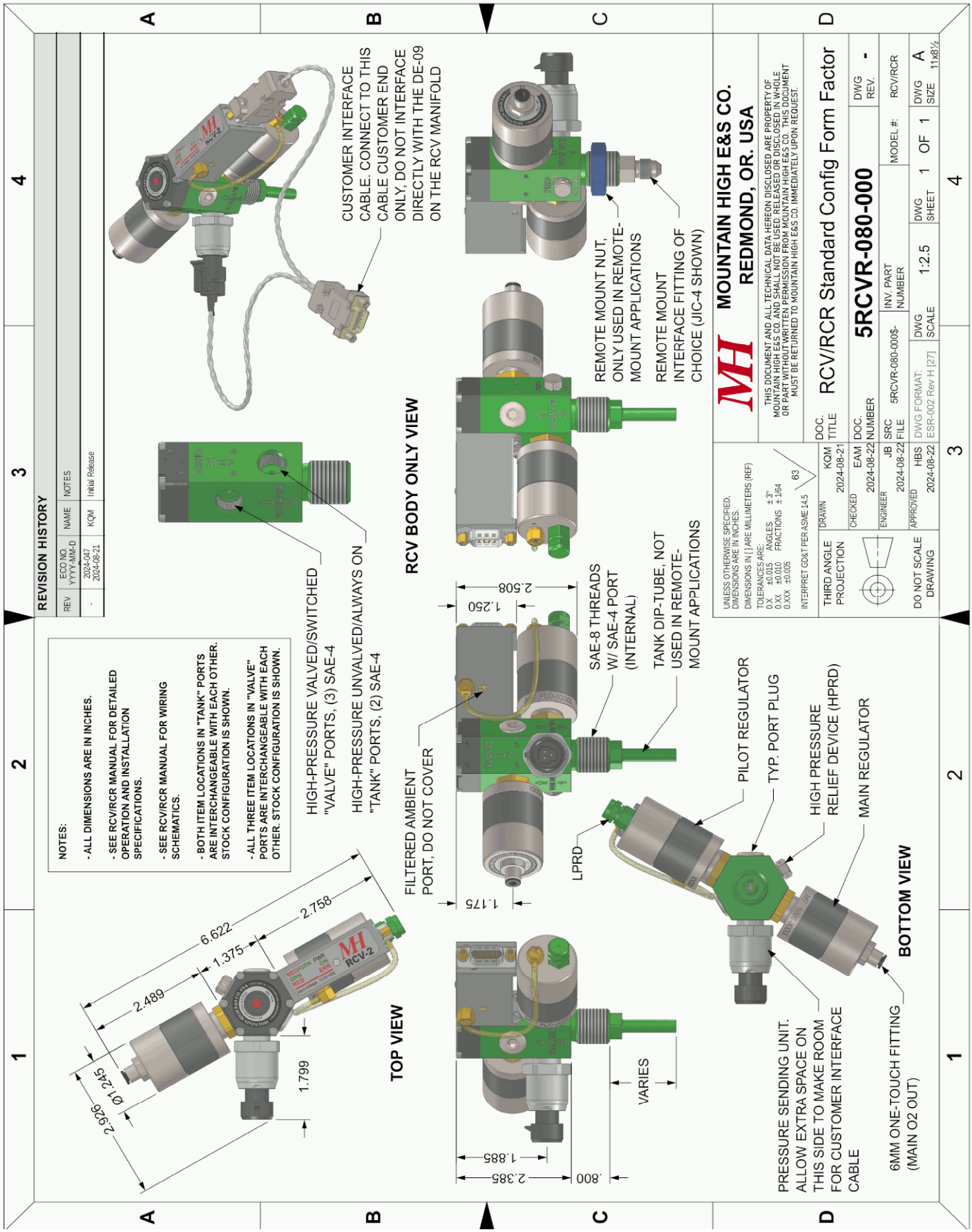
DOC. TITLE RCV/RCR-2DP Standard Config Form Factor
DOC. NUMBER 5RCVR-082-000
DWG REV -
SRC FILE 5RCVR-082-000$-
INV. PART NUMBER
MODEL #: RCV/RCR
DWG FORMAT: ESR-002 Rev H [27]
DWG SCALE 1:2.5
DWG SHEET 1 OF 1
DWG SIZE A 11x8½


REVISION HISTORY
REV
ECO NO. YYYY-MM-D
NAME
NOTES
-
2024-047 2024-08-21
KQM
Initial Release
NOTES:
- ALL DIMENSIONS ARE IN INCHES.
- SEE RCV/RCR MANUAL FOR DETAILED OPERATION AND INSTALLATION SPECIFICATIONS.
- SEE RCV/RCR MANUAL FOR WIRING SCHEMATICS.
- BOTH ITEM LOCATIONS IN "TANK" PORTS ARE INTERCHANGEABLE WITH EACH OTHER. STOCK CONFIGURATION IS SHOWN.
- ALL THREE ITEM LOCATIONS IN "VALVE" PORTS ARE INTERCHANGEABLE WITH EACH OTHER. STOCK CONFIGURATION IS SHOWN.
HIGH-PRESSURE VALVED/SWITCHED "VALVE" PORTS, (3) SAE-4
HIGH-PRESSURE UNVALVED/ALWAYS ON "TANK" PORTS, (2) SAE-4
CUSTOMER INTERFACE CABLE. CONNECT TO THIS CABLE CUSTOMER END ONLY. DO NOT INTERFACE DIRECTLY WITH THE DE-09 ON THE RCV MANIFOLD
RCV BODY ONLY VIEW
REMOTE MOUNT NUT, ONLY USED IN REMOTE-MOUNT APPLICATIONS
REMOTE MOUNT INTERFACE FITTING OF CHOICE (JIC-4 SHOWN)
TOP VIEW
6.622
2.758
2.489
1.375
1.799
2.926
Ø1.245
FILTERED AMBIENT PORT, DO NOT COVER
SAE-8 THREADS W/ SAE-4 PORT (INTERNAL)
TANK DIP-TUBE, NOT USED IN REMOTE-MOUNT APPLICATIONS
2.508
1.250
1.175
LPRD
PILOT REGULATOR
TYP. PORT PLUG
HIGH PRESSURE RELIEF DEVICE (HPRD)
MAIN REGULATOR
BOTTOM VIEW
PRESSURE SENDING UNIT. ALLOW EXTRA SPACE ON THIS SIDE TO MAKE ROOM FOR CUSTOMER INTERFACE CABLE
6MM ONE-TOUCH FITTING (MAIN O2 OUT)
2.385
1.885
.800
VARIES
UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES.
DIMENSIONS IN [ ] ARE MILLIMETERS (REF)
TOLERANCES ARE:
0.X ±0.015 ANGLES ± 3°
0.XX ±0.010 FRACTIONS ± 1/64
0.XXX ±0.005
INTERPRET GD&T PER ASME 14.5
63
THIRD ANGLE PROJECTION
DO NOT SCALE DRAWING
DRAWN KQM 2024-08-21
CHECKED EAM 2024-08-22
ENGINEER JB 2024-08-22
APPROVED HBS 2024-08-22
DOC. TITLE
RCV/RCR Standard Config Form Factor
DOC. NUMBER
5RCVR-080-000
SRC FILE 5RCVR-080-000$-
DWG FORMAT: ESR-002 Rev H [27]
DWG SCALE 1:2.5
INV. PART NUMBER
DWG SHEET 1 OF 1
MODEL #: RCV/RCR
DWG REV: -
DWG SIZE A 11x8½
MOUNTAIN HIGH E&S CO.
REDMOND, OR. USA
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RTCA DO1-160 C through G

Targeted RTCA DO-160 x specifications for the design of the RCV-2D & 2DL is derived from the RTCA DO-160 set of tests in order to demonstrate compliance within an acceptable score in regard to the following sections.

Section 01~03:
Purpose and Applicability, Definitions of Terms, & Conditions of Tests. NYA

Section 04: Temperature & Altitude
Altitude alone is not an issue. However, electronic and electro-mechanical parts consuming electrical power need a minimum amount of air pressure in order to help dissipate the generated heat. Therefore, it is a good practice to minimize any dissipation requirements in order to achieve a respectable high altitude operating target. The RCV-2D achieves this by having the electro-pneumatic pilot valves, needing electrical energy only transiently for on/off actions. In addition, the PCB's thermal mass is carefully calculated with component placements spaced appropriately to mitigate hot spots. Operating temperature range for the RCV/RCR is -40 to +65 °C. Non-operating: -80 to + 75 °C. Operating altitude range for the RCV/RCR up to flight levels 40+ can be tolerated providing the operating temperature ranges are not exceeded.

Section 05: Temperature Variation
*Reference section 04

Section 06: Humidity
*Reference section 13.

Section 08: Vibration
The compact lightweight design of the RCV-2D was targeted for good compliance of this section. The IPC-A-610E class-2 PCB is a light-weight, small form-factor of about 2 square inches with low profile surface mount parts where the moments of inertia are kept very small.

Section 09: Explosion Proofness
There are no electrical contacts associated with electro-mechanical relays or other contacts. This results in a 100% elimination of the possibility for contact arcing. *Reference section 13.

Section 10: Waterproofness
As the RCV-2D has been constructed with sand, dust & water exposure and ingress mitigation in view, it should not be considered as waterproof. It is incumbent upon the installer to keep this in mind. In addition, during the periodic inspections any signs of water or other fluids ingress should prompt a full overhaul procedure of the RCV-2D.

Section 11: Fluids Susceptibility
*Reference section 10

Section 12: Sand and Dust
*Reference section 10

Section 13: Fungus Resistance
The small PCB that resides in the shielded manifold assembly is conformal coated per MIL-I-46058C or equivalent.

Section 14: Salt Fog
*Reference section 13.

Section 15: Magnetic Effect
Although there are two electro-magnetic controlled pneumatic valves in the RCV-2D, they are intrinsically magnetically shielded, by design and use very low momentary (pulsed) electro-magnetic fields only to change pneumatic states, then generate none. Additionally, the RCV-2D is protected from outside static magnetic disruption by double metallic shielding. AC magnetic fields are nearly completely rejected due to the common mode field generated by AC fields. However, it is advisable that the RCV-2D is not intentionally installed within 36" of a known high-power electro-mechanical device that generates high DC or AC magnetic fluxes.

Section 16: Power Input
Operating input voltage ranges for the RCV-2D are from 11 to 28 VDC and able to tolerate reverse applied voltage situations without damage and will operate with a reverse polarity supply, but will not on any AC voltages. The RCV-2D operates as a normal on/off electrically-powered, remotely-controlled, solenoid-operated valve. It achieves a low operating current by employing a built-in pulse on/off latching analog circuitry that draws the most power only during short-time transitioning from the off to the on state, ~350 ma.

maximum for about 25 ms. A small supervisory DC current at or less than 50ma. from the built-in LED indicator is drawn while power is applied during the on state. This is suitable so that smart power bus management systems can optionally confirm the power and hold on and off actions have been detected in response to the DC power being applied and removed. By design, the RCV-2D is to initiate operation with a wide range of soft-start (slow rising & falling) power on/off voltages as seen optionally configurable as a (soft-start power-on) with some smart electronic power bus management systems.

Section 17: Voltage Spikes
All internal analog circuitry eliminates RFI issues and is tolerant to EMI assaults typical of aircraft electrical systems and transponder energies. Large lasting negative voltage spikes, in the order of 250 ms. and longer, may cause the RCV-2D to initially snap-off, but will immediately snap back on assuming that the specified DC voltage level is persistent during these spike events. These types of spikes are usually so fast that the time constant in the pneumatic pilot valve circuit may not respond with an off motion. However, larger than 250 ms. spikes will most likely cause the RCV-2D to quickly cycle off then back on. These events cause no harm to the RCV-2D, but may cause momentary interrupts to the supply of the gas pressure the RCV-2D is serving. It is important that the RCV-2D is wired with a dedicated 22 to 24 AWG. shielded twisted-pair cable, MIL-C-27500 where the power and ground are provided through this wiring. **Do not use an aircraft frame ground point near the end of the wiring at the RVC-2D unit for the power/ground return**. Use of shielded twisted-pair cable, MIL-C-27500 is required for installation.

Section 18: Audio Frequency Conducted Susceptibility-Power Inputs
Use of a dedicated shielded twisted-pair cable, MIL-C-27500 is required for supplying power to the RCV-2D. Testing has shown that with the proper wiring and grounding method, any perturbations to these effects are eliminated. However metallic intrusions such as another cable crushed into the supply cable to the point where insulation is displaced and metallic contact or shorting ensues are not tolerated. The RCV-2 has been tested with various signal inductions from 20 to 400 Hz and relative harmonics. that may be typically seen in tight aircraft wiring systems. It has shown to be highly immune showing no dysfunction during such. However, it has been noted, only in the case of the RCV-2D version and not wired with the noted shielded wire type, that if the on/off power control switch is a simple SPST type where the off position leaves the power lead open, high enough Audio on or adjacent AC power line injections may cause the RCV-2D to rectify the signal and power it into a meta stable state enough to cause un graceful on to off transitions. This is 100% remedied by using a SPDT power control switch that shunts the power lead to the RCV-2D directly to its return lead in the power off position. Again, using the proper shielded wiring mitigates this issue greatly.

Section 19: Induced Signal Susceptibility
Reference section 18, 17 and 16

Section 20: Radio Frequency Susceptibility (Radiated and Conducted)
All internal analog circuitry eliminates RFI issues as well as tolerant to EMI assaults typical of aircraft electrical systems and transponder energies. Reference section 17

Section 21: Emission of Radio Frequency Energy
*Reference section 20

Section 22: Lightning Induced Transient Susceptibility
The electrical power leads on the DE-09 connector of the RCV-2D are in a common mode and floating configuration in respect to main ground. The internal electronic PCB analog electronics are not grounded to the RCV-2D manifold body. Only the shielding of the wire pair cable is to be grounded to the RCV-2D via the DE-09 connector. In the event the frame of the aircraft is composite fiber, the RCV-2D must be grounded by this shield, else it could be grounded at the endpoint where the RCV-2 is installed only providing this point is not a high current return for accessories such as hydraulic pumps and auto-pilot motor servos. *Currently the shield is not connected to the RCV, but grounded to a common grounding node at the panel.*

Section 23: Lightning Direct Effects
N/A as the RCV-2D is not designed to be installed in the extremities of an aircraft such as wings and control surfaces. The RCV-2D must be installed in an area of the fuselage so that it is relatively shielded from these drastic exposures.

Section 24: Icing
N/A *reference section 23

Section 25: Electrostatic Discharge
*Reference section 22

Section 26: Fire, Flammability
All materials used in the construction of the RCV-2D are selected in respect to the FAA document DOT/FAA/AR-00/12 Aircraft Materials Fire Test Handbook as it applies to non-person occupant areas of an aircraft.

Glossary

ASTM International
Formally known as American Standard for Testing & Materials

AWG
American Wire Gauge

Bipolar Power
A source of DC power that can reverse polarity to change the state of the device being powered

Latching valve
A latching valve is a type of valve that is designed to stay either open or closed without continuous power. A latching valve allows the user to pulse the valve with reversible bipolar currents and have it change state, thus saving power and producing un-necessary heating of the valves electromagnet. It's also known as a bi-polar valve in other parts of the world.

LED
Light emitting diode for low power visual indications of powered states for a device

TSO
Technical Standard Order per FAA, is a minimum performance standard for specified materials, parts and appliances used on civil aircraft.

SPST
An electro-mechanical contacting switch that controls voltage in a Single-Pole-Single-Throw toggling operation. Could also pertain to relays

DPST
An electro-mechanical contacting switch that controls voltage in a Double-Pole-Single-Throw toggling operation. Could also pertain to relays

SBA
A Supplemental Breathing Device is a breathing device that supplements the ambient atmosphere with another gas source

SCBA
A Self Contained Breathing Device is a breathing device that provides 100% of air or oxygen to the user

RCV
A remotely operated compressed gas valve

RCV/RCR
A remotely operated compressed gas valve and regulator combo

RTCA
Radio Technical Commission for Aeronautics. RTCA is an official observer to the International Civil Aviation Organization (ICAO)

EMI / RFI
Electromagnetic Interference / Radio Frequency Interference

Glossary

NPT
National Pipe Tapered

NPSM
National Pipe Straight Mechanical

ISO
International Standards Organization

SAE
Society of Automotive Engineers International

JIC
Joint Industrial Council

NFPA
National Fluid Power Association

BSP
British Standard Pipe

DIN
Deutsche Industrial Norme

JIS
Japanese Industrial Standard

BSPT
British Standard Pipe Tapered

BSPP
British Standard Pipe Parallel