# Data Sheet 7.40
# Issue A

# Priority Demand Valve
# Fig. PDV-02V2

BS9251: 2021

## Product Description

Rapidrop's innovative electrically driven Priority Demand valve for use with mains water supply or stored water supply residential sprinkler systems.

Designed to meet the requirements of BS 9251: 2021 - Valve for isolating domestic supply in the event of sprinkler activation.

Upon activation of a flow switch/alarm relay, the valve will automatically close the domestic supply allowing all water to flow to the sprinkler system and remain closed until manually reset. Upon activation of a low level tank switch (if installed) the control box can be configured to either automatically close and re-open once the low level tank switch resets itself or latch closed until the system is manually reset.

The priority demand valve is available in ball or butterfly type body attached to a specific actuator.

The priority demand valve is available in two different configurations:

- Single PDV - Used in systems designed with a single priority demand valve.

- Multiple PDV - Used in systems designed with multiple priority demand valves. Up to 25 PDVs can be simultaneously operated by a single flow switch/ alarm relay signal. **(Data sheet 7.23)**

## Features

**Ball Valve**

- Full Bore
- WRAS approved

**Butterfly valve**

- Stainless steel disc, EPDM liner
- Epoxy coated ductile iron body
- WRAS approved

**Actuator**

- Failsafe close operation (operated by an internal replaceable lithium-Ion battery)
- End of travel relay switch for valve positioning (BMS connection)
- Visual LED indicator for positional identification
- Maximum Allowable 'Stem Torque' to protect valve
- External GSA Connectors (For RAS actuator, M20 Glands for RAM actuator)
- IP67 Rated Actuator
- Maximum of 5W power consumption (24V DC)

## Operation

Rapidrop Priority demand valve is a power to open, power to close valve. In the event of power loss the valve will failsafe to the close position.

## Working Pressure

Max. Working Pressure 16 bar (232 psi)

## Working Temperature Range

0°C to 70°C (14°F to 158°F)

## Connections

**Ball valve (DN25 to DN50)**

- BSP female thread according to ISO 228/1

**Butterfly valve (DN65 to DN125)**

- Semi lug wafer pattern to suit PN16 Flange according to BS EN 1092 and Table D/E flanges according to BS 10

## Single PDV System Ordering Codes

| Sizes | | Isolation Valve | Actuator Model | Ordering Codes Valve & Control Box |
|---|---|---|---|---|
| mm | Inch | | | |
| DN25 | 1" | Ball Valve | RAS | RDPDV-025-AS |
| DN32 | 1 1/4" | Ball Valve | RAS | RDPDV-032-AS |
| DN40 | 1 1/2" | Ball Valve | RAS | RDPDV-040-AS |
| DN50 | 2" | Ball Valve | RAS | RDPDV-050-AS |
| DN65 | 2 1/2" | Butterfly Valve | RAM | RDPDV-065-AS |
| DN80 | 3" | Butterfly Valve | RAM | RDPDV-080-AS |
| DN100 | 4" | Butterfly Valve | RAM | RDPDV-100-AS |
| DN125 | 5" | Butterfly Valve | RAM | RDPDV-125-AS |




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# Priority Demand Valve
# Fig. PDV-02V2

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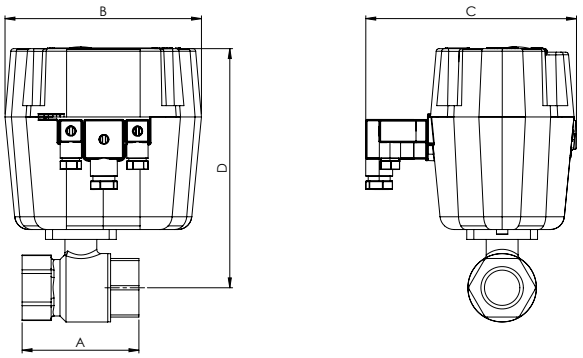
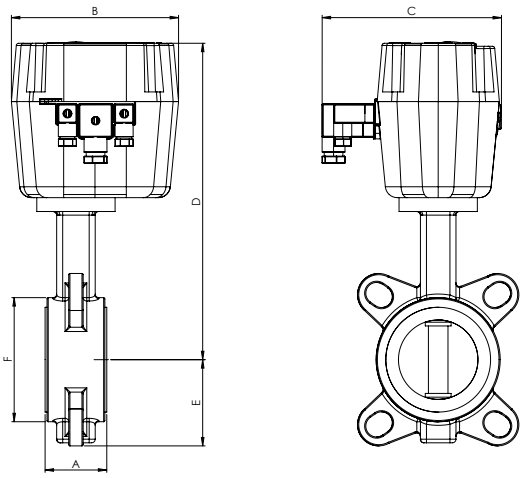
## Ball Valve Dimensions

| Sizes | | Dimensions (mm) | | | | Flow Rate (KV) |
|---|---|---|---|---|---|---|
| mm | Inch | A | B | C | D | |
| DN25 | 1" | 83 | 140 | 150 | 170 | 43 |
| DN32 | 1 1/4" | 94 | 140 | 150 | 175 | 89 |
| DN40 | 1 1/2" | 102 | 140 | 150 | 187 | 230 |
| DN50 | 2" | 124 | 140 | 150 | 194 | 265 |




## Butterfly Valve Dimensions

| Sizes | | Dimensions (mm) | | | | | | Flow Rate (KV) |
|---|---|---|---|---|---|---|---|---|
| mm | Inch | A | B | C | D | E | F | |
| DN65 | 2 1/2" | 46 | 203 | 206 | 328 | 69 | 102 | 108 |
| DN80 | 3" | 46 | 203 | 206 | 334 | 90 | 118 | 261 |
| DN100 | 4" | 52 | 203 | 206 | 354 | 106 | 150 | 518 |
| DN125 | 5" | 56 | 203 | 206 | 374 | 119 | 174 | 883 |




## Installation in pipework

The valve may be installed in any position and the flow may be from either direction through the valve.

1. Visually inspect the valve, make sure that the connections are clean of debris and any foreign materials.
2. Mount/connect the valve to the pipework (Valve in the closed position) **Note for butterfly valve bodies do not over torque the flange. This may distort the rubber seal.** The use of powertools such as impactdrivers are not recommended as these can distort the rubber faceand impair valve operation.

Firstly hand tight and use an adjustable spanners which will be more suitable to secure the butterfly valve into the system.

Using the tightening sequence will reduce the potential damage to the rubber seating face.

3. Once secure, tighten the flange bolts to the required torque as described on page 3

## Specifications

| Valve Size/ Actuator model | DN25 - DN50 (1" - 2") **RAS Actuator** | DN065 - DN125 (2 1/2" - 5") **RAM Actuator** |
|---|---|---|
| Working Time 0-90° | 8 Seconds | 4 Seconds |
| Current | 0.55A | 0.55A |
| Power Supply | 12-30V | 12-30V |
| IP Rating | IP67 | IP67 |
| End of Travel Relays | 300VAC/900mA - 30VDC | 250VAC/5A - 30VDC |
| Ambient Temp Range | -20°C to 70°C | -20°C to 70°C |
| Manual Override | Local Buttons (Disabled as standard) | Local Buttons (Disabled as standard) |
| Bluetooth Control | Via Android App | Via Android App |
| Cable Entries | External GSA | 2 x M20 Cable Glands |

WRAS approval for valve body owned by Brandoni S.P.A

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# Priority Demand Valve
# Fig. PDV-02V2

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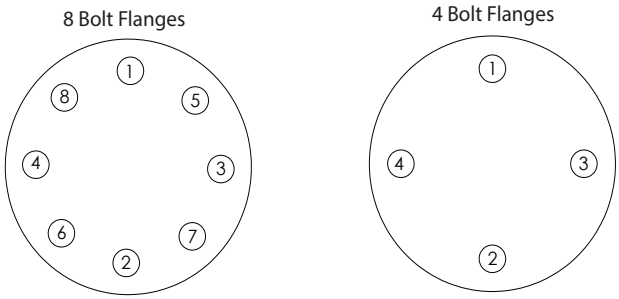
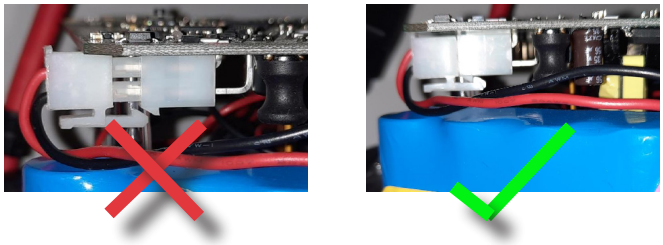
## Flange Tightening Sequence

Below are two tightening sequences for 4 and 8 bolt flanges to secure priority demand valves with butterfly valves into the system.

| Flange Tightening Torques Nm | | | |
|---|---|---|---|
| Size | | Bolt size | Max |
| mm | Inches | | |
| 65 | 2 1/2" | M16 | 60 |
| 80 | 3" | M16 | 75 |
| 100 | 4" | M16 | 80 |
| 125 | 5" | M16 | 120 |

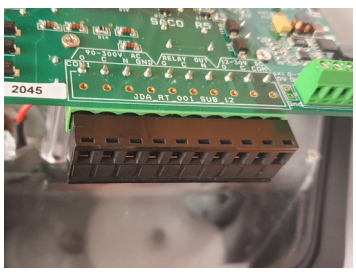


Ensure battery connection is completely in place!

## RAS - GSA Connector

## RAM terminal block



## Connection of battery

RAS - Remove the lid by undoing the 4 bolts using a 3mm allen key. Connect the battery within the actuator using the nylon male/female plug. Re-assemble the lid cover. Undo the centre GSA screw using a Phillips or flat-head screwdriver. Wire as per wiring diagram. Re-assemble the GSA plug onto the actuator.

RAM - Remove the lid by undoing the 6 bolts using a 3mm allen key. Connect the battery within the actuator using the nylon male/female plug. Disconnect the terminal block and wire as per wiring diagram. Re-assemble the lid.

## Additional information

The internal battery is disconnected for storage/travel and to prevent detriment to the battery. During commissioning or after, if the PDV is going to be unpowered for a prolonged period (Over 1 year RAS & over 1 month RAM) we recommend disconnecting the battery to secure its longevity.

It is recommended that mains power is connected within 1 month of receiving the PDV.

The battery is supplied fully charged and disconnected from the actuator. Battery connector is push fit located underneath the PCB board this should be attached immediately prior to connection to mains power.

The battery is designed to be only used in failsafe mode. (e.g., Power outage) Repeated operation under battery power will rapidly drain the battery voltage beyond ability disabling the valve.



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# Priority Demand Valve
# Fig. PDV-02V2

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## Operation/Function Guide

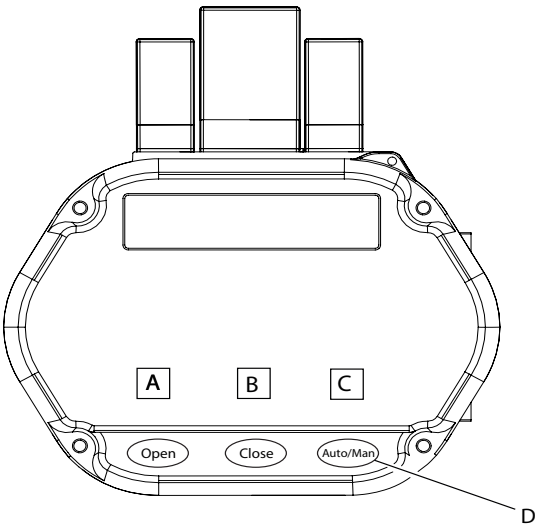
### RAS Actuator Model DN25-DN50 (1"- 2")

LED Function Table

| LED | LED Colour | LED Function |
|---|---|---|
| A - Bluetooth | Solid Blue | Paired |
| | Off | Asleep |
| | Flashing Blue | Awake Bluetooth not paired |
| B - Charging | Solid Blue | Charging |
| | Off | Charged |
| C - Direction/ Operation | Green Solid | Open |
| | Green Flashing | Opening |
| | Red Solid | Closed |
| | Red Flashing | Closing |
| | Slow Orange Flash | Manual Mode |
| | Rapid Orange Flash | Over Torque |

Note : The touchpad button text is not related to the LED function (D)

RAS Actuator
LED Illustration

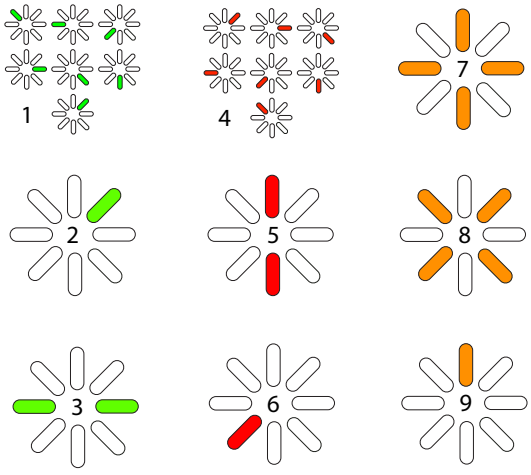



### RAM Actuator Model DN65-DN125 (2 1/2" - 5")

LED Function Table

| Illustration Number | LED Colour | LED Function |
|---|---|---|
| 1 | Rotating Green | Valve Opening |
| 2 | Flashing Green | Connected to Bluetooth |
| 3 | Solid Green | Valve Open |
| 4 | Rotating Red | Valve Closing |
| 5 | Solid Red | Valve Closed |
| 6 | Flashing Red | Valve is in Manual Mode |
| 7 | Flashing Amber | Valve failed to complete move in time |
| 8 | Flashing Amber | Reached Max Torque |
| 9 | Flashing Amber | Battery Voltage Low |

RAM Actuator
LED Illustration







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# Priority Demand Valve
# Fig. PDV-02V2

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## Control Box

Upon activation of a flow switch or alarm relay, the PDV will automatically latch in the closed position, it will remain closed until the control box is manually reset (Via the reset button)

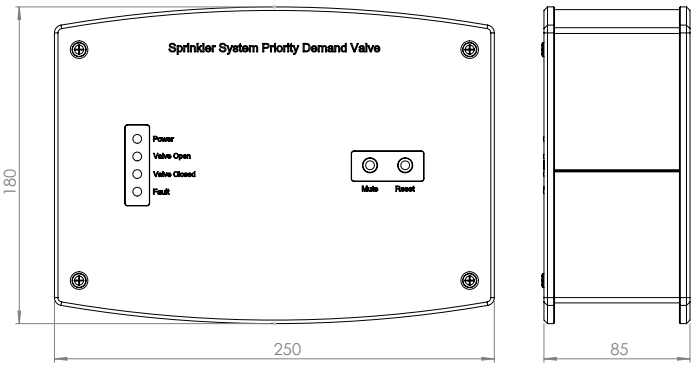
Upon activation of a low tank level switch, the PDV can be configured to close and open automatically **or** remain closed until the control box is manually reset (Via the reset button)

Upon loss of power to the control box the valve will fail-safe to the closed position. It will automatically reopen to the correct state once power is restored.

- Designed to meet the requirements of BS9251: 2021

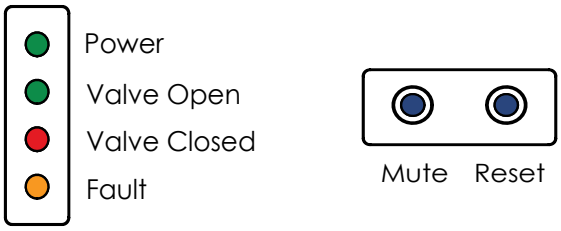

## Features

- Internal terminals for connection of:
  - Power supply to control box
  - Power to PDV
  - End of travel relay to PDV (position)
  - Flow Switch/ Alarm Relay
  - Tank Low Level Switch
  - Output to monitor flow switch state
  - Output to monitor tank low level switch state
  - Output for BMS
- LED to indicate the current position of the valve (Green LED - valve fully open, Red LED - valve fully closed, Amber LED - Any faults)
- Time delay for flow switch and tank low level devices
- Additional flow and tank low level switch outputs
- Configure the flow switch and tank low level as NC or NO contacts
- Internal sounder
- Enclosure tamper switch
- M20 knockout cable glands
- Rear knockout for optional cable entry
- IP54 Certified




## LED Operation - Control box

| LED | LED Colour | Status |
|---|---|---|
| Power | Green | Mains supply on |
| Valve Open | Green | PDV fully open |
| Valve Closed | Red | PDV fully closed |
| Fault | Orange | Fault |




## Button Operation - Control box

| Button | Function |
|---|---|
| Mute | Silences internal sounder |
| Reset | With the PDV latched closed, the reset button will open the PDV providing all input signals are no longer active (Flow switch and tank low level when set to latch) |

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# Priority Demand Valve
# Fig. PDV-02V2

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## Configuration

1. Depending on wiring, toggle the flow switch as normally open (NO) or normally closed (NC)

2. Depending on wiring, toggle the tank low level switch as normally open (NO) or normally closed (NC)

Note: If no tank low level switch is installed set toggle to NO

3. Toggle the tank low level switch to either latch closed (YES) or not latch closed (NO)

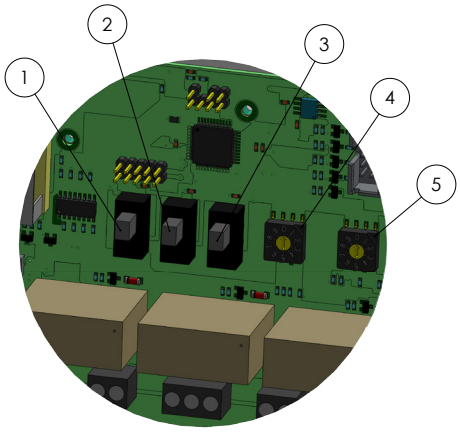
Note: If set to YES, upon activation of the tank low level switch the PDV will remain closed until manually reset.

4. Flow switch time delay - Select a time delay up to 30 seconds to prevent false signals/ delay for activating the PDV

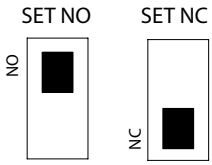
Note: Rotate the switch with a screwdriver, Switch increments in 3 seconds for example if set to 4 this will provide a 12 second delay.

5. Tank low level switch time delay - Select a time delay up to 30 seconds to prevent false signals/ delay for activating the PDV

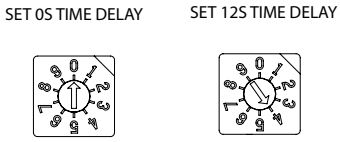
Note: Rotate the switch with a screwdriver, Switch increments in 3 seconds for example if set to 3 this will provide a 9 second delay.



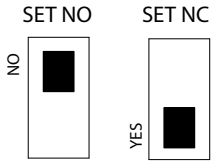

INPUT DEFAULT STATES




INPUT TIME DELAYS




TANK LOW LEVEL LATCH




## Table of Operation Control Box

| | Power LED | Valve Open LED | Valve Closed LED | Fault LED | Sounder | BMS Output | Flow Switch Output Relay | Tank Low Level Output Relay |
|---|---|---|---|---|---|---|---|---|
| Power On | X | | | | | | | |
| PDV Open | X | X | | | | | | |
| PDV Closed | X | | X | | X | X | | |
| Tamper - Enclosure | X | | | X | X (Beeping) | X | | |
| Flow switch active | X | | | | | | X | |
| Tank low level active | X | | | | | | | X |
| Valve not fully open or fully closed | X | | | X | X | X | | |
| Reset button pressed when inputs are still active | X | X (Flash) | X (Flash) | X (Flash) | X (Beep) | | | |

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# Priority Demand Valve
# Fig. PDV-02V2

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## Commissioning

Verify the operation of the Priority Demand Valve.

1. Activate the flow switch(s) or connected alarm relay (Fire signals) within the system. The PDV will fully close. Remove the fire signal. Ensure the valve remains closed. Press the reset button the valve will fully open.

2. If installed verify the tank low level switch operation

2A. Tank Low Level (Latch set to YES) Activate the tank low level switch. The PDV will fully close. Remove the signal. Ensure the valve remains closed. Press the reset button the PDV will fully open.

2B. Tank Low Level ( Latch set to NO) Activate the tank low level switch. The PDV will fully close. Remove the signal, the PDV will fully open.

3. Turn the power supply off to the control box. Verify the PDV fully closes. Refer to the actuator LEDs. Restore the power supply to the control box

4. Verify any connected outputs function as per table of operation (if being utilised)

Note: Follow the table of operation for functionality of sounder and LEDs (Page 6)

## Care and Maintenance

The priority demand valve requires very little maintenance.

- Ensure all valve body connecting bolts are securely fastened
- Ensure the battery is fully charged, 8V (RAS), 15.8V (RAM)

An orange flashing LED light indicates the battery requires regenerating or replacing. Rapidrop recommend replacing the battery every 3 years at a minimum to prevent detriment of the system.

General control box considerations including but not limited to;

- Ensure all terminals/wires are secure
- Ensure all electrical components are checked in relation to BS7761:2018

It is advisable to inspect and verify the operation of the unit annually or in accordance with the authority having jurisdiction.

## Important information

- The installation and maintenance of the priority demand valve must only be made by qualified personnel.
- Ensure electrical installation is as per BS 9251: 2021
- Before removing any covers, always make sure the power supply to the control unit is shut off.
- Failure to follow these instructions could cause improper operation, resulting in personal injury and/or property damage.
- For further details and technical support please contact your Rapidrop sales representative.

## Troubleshooting guide

| Issue | Cause | Corrective Action |
|---|---|---|
| PDV not Powering on | Power supply / Battery | • Check Battery Connected<br>• Check Battery Voltage (refer to maintenance for correct voltage)<br>• Check Wiring Diagram |
| Over torque | Over tightened flange causing the valve seat to distort or foreign body within pipe | • Loosen flange bolts to try to rectify valve seat distortion |
| Battery low | Battery | • Power the PDV (this will allow the battery to charge)<br>• Replace the battery<br>• Charge the battery for a minimum of 1 hour (Or longer if the battery is very low) |
| Valve not functioning | Potential PCB sensor location | • Ensure the PCB is fixed in place as supplied<br>• Ensure the Actuator lid is fixed in place (RAS) |
| Valve failed to move in time | Actuator taken longer than the pre-set time to move | • Contact Rapidrop to modify settings |
| Fault LED on Enclosure | Refer to table of operation (Page 6) | • Ensure the Latch box tamper switch is engaged<br>• Investigate why valve is not fully open or fully closed. |

The table above is intended as a guide. Please call Rapidrop for any queries

**RESPONSIBLE DISPOSAL**

Rapidrop recommend that the product needs to be disposed of correctly when the product reaches the end of its life cycle.

• Disposal of business or commercial waste should be in compliance and accordance with government guidance and regulations

• Disposal of electrical waste should be in compliance and accordance with "Waste Electrical and Electronic Equipment recycling" (WEEE)

RoHS Compliant




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# Priority Demand Valve
# Fig. PDV-02V2

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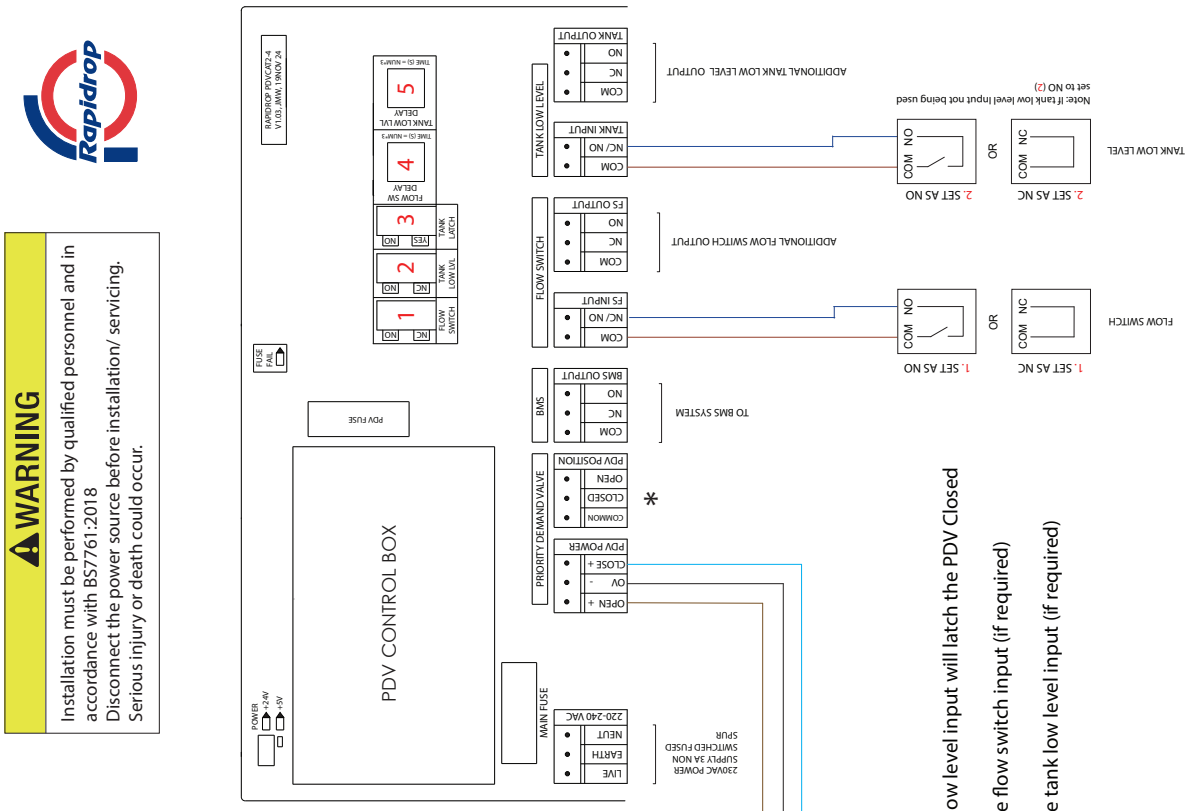
## RAS DN25-DN50 (1- 2") Wiring Diagram




Relay Out

| RAS Wiring | |
|---|---|
| Actuator | Control Box |
| 1 | OPEN |
| 2 | CLOSED |
| 3 | COMMON |

Note: Use the Relay Connection within the isolation valve

Power Supply (24V)

| RAS Wiring | |
|---|---|
| Actuator | Control Box |
| 1 | OPEN + |
| 2 | CLOSE + |
| 3 | 0V |

Note: Use the 12-30V DC Connection within the actuator

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# Priority Demand Valve
# Fig. PDV-02V2

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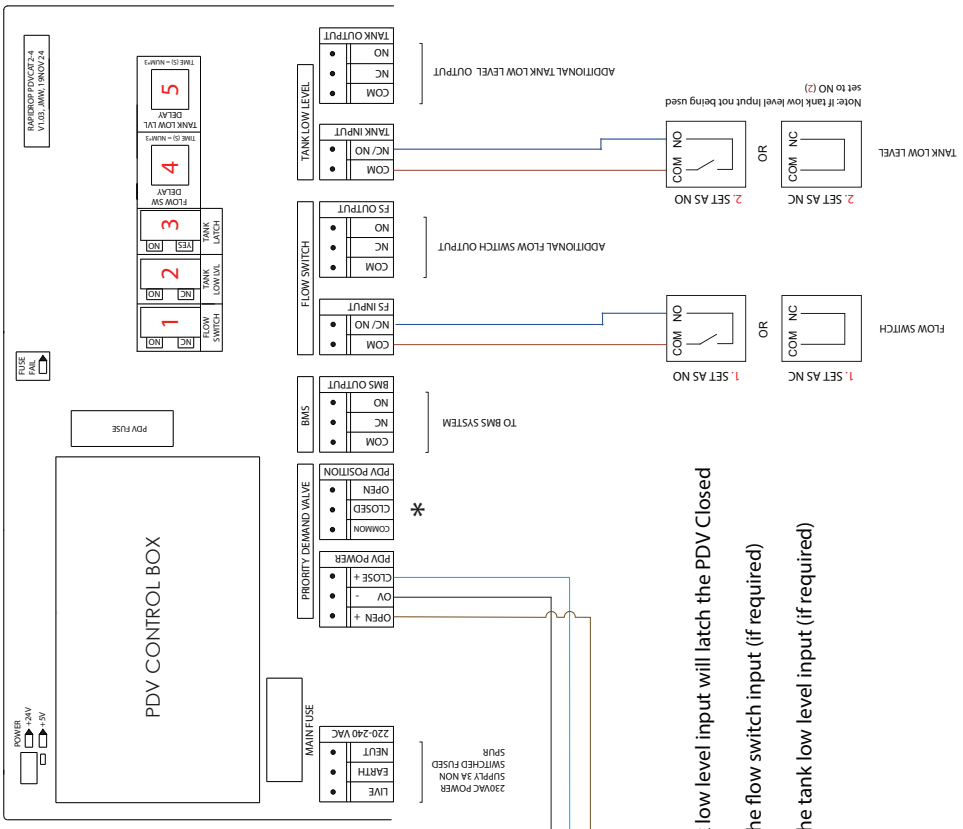
## RAM DN65-DN125 (2 1/2"- 5") Wiring Diagram




**WARNING**

Installation must be performed by qualified personnel and in accordance with BS7761:2018
Disconnect the power source before installation/ servicing.
Serious injury or death could occur.

Relay Out

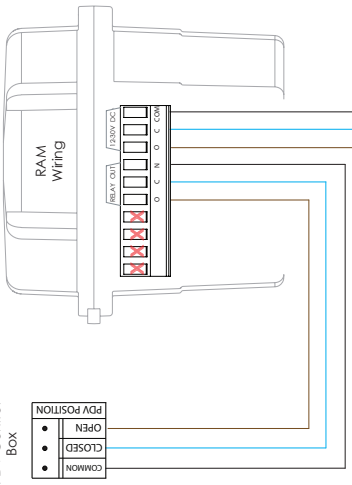
| RAM Wiring | |
|---|---|
| Actuator | Control Box |
| O | OPEN |
| N | COMMON |
| C | CLOSED |

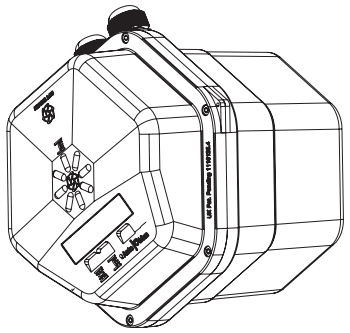
Note: Use the Relay Connection within the isolation valve

Power Supply (24V)

| RAM Wiring | |
|---|---|
| Actuator | Control Box |
| O | OPEN + |
| C | CLOSE + |
| COM | 0V |

Note: Use the 12-30V DC Connection within the actuator



Actuator Illustration

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