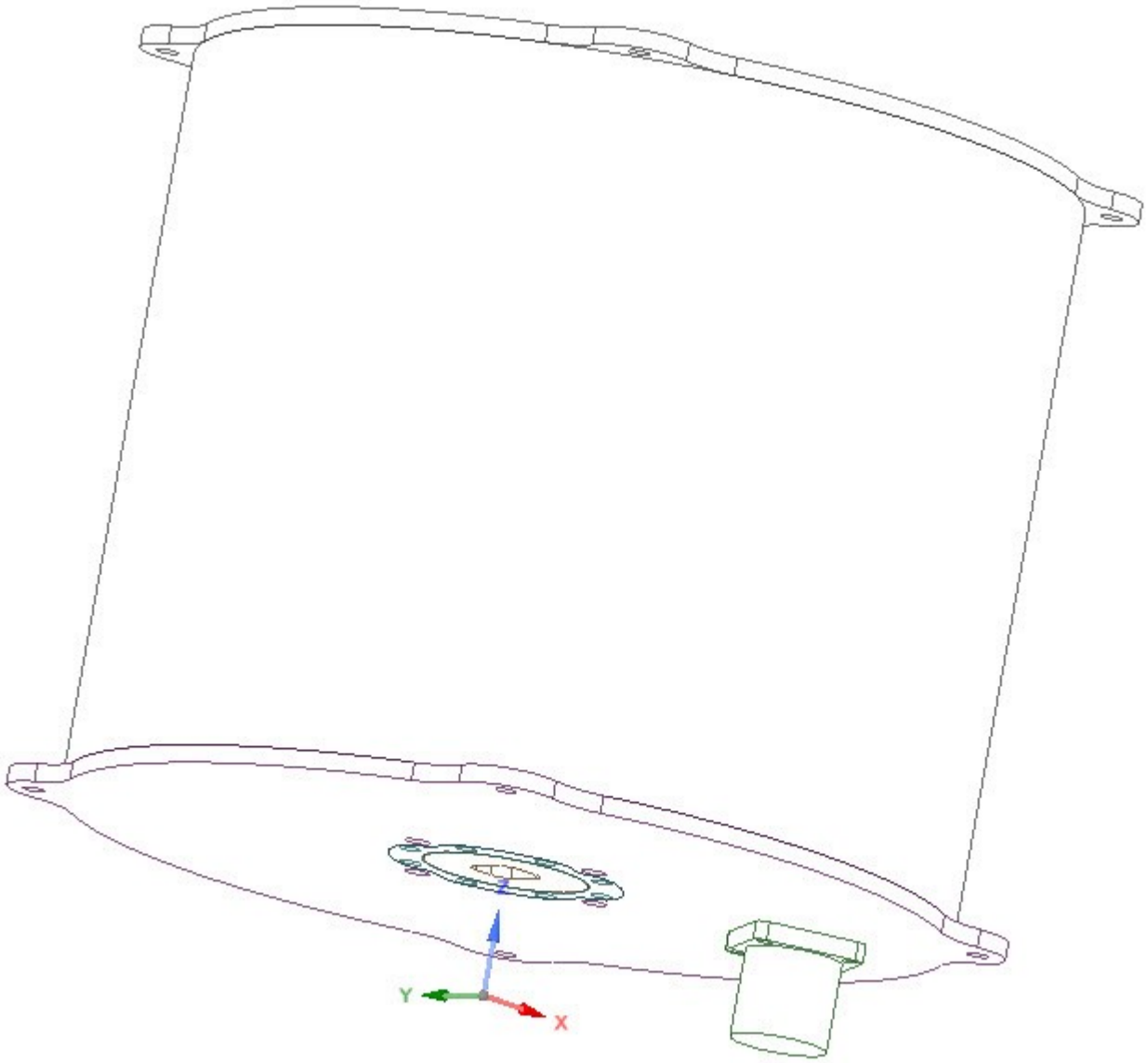
INSTALLATION OPERATION & MAINTENANCE INSTRUCTIONS

RIFT® 400 Sub-Sea Actuator



VERSION 1.2

INTRODUCTION, STORAGE, AND SAFETY INFORMATION:

INTRODUCTION

The RIFT® 400 Actuator is the first commercial **RIFT DRIVEN®** product and is also the first Electric Valve Actuator that can be configured to offer either the functionality of a part-turn electric valve actuator, a direct acting solenoid or that of a multi-turn actuator. Correctly applied, configured, installed, connected, commissioned and used the RIFT® 400 will provide trouble-free, reliable and extremely energy efficient service. Energy consumption will be reduced by approximately 75%. This actuator is sold as an up to 400Nm part turn electric actuator with the ability to upgrade its default settings and features with the minimum disruption to the client or customer.

These IOM's (Installation, Operation & Maintenance Instructions) are provided to offer advice and information to installers and users of the RIFT® 400 to achieve reliable and trouble-free service. The following symbols are used to indicate warnings:

Yellow warning triangle advises actions that MAY cause incorrect operation and non-adherence to the warnings COULD result in product failure and potential personal injury and/or consequential damage.

Red warning triangles advise actions that WILL cause incorrect operation and that non adherence to the warnings WILL result in product failure and potential personal injury and/or consequential damage.

STORAGE

Store in a well-ventilated and dry room. Actuators should be stored off the floor, either on a shelf or on a wooden pallet, for example. Replace supplied transit plastic cable entry plugs with solid plugs and PTFE thread tape.

Do not store the Actuators with the covers or cable entry plugs removed, as no responsibility will be accepted for on-site deterioration caused by the covers being removed.

SAFETY INFORMATION

All personnel working with the RIFT® 400 must be familiar with this Installation, Operation & Maintenance instructions, and the safety recommendations are to ensure correct functionality of the RIFT® 400 Electric Actuator and to avoid personal injury or property damage that could occur from non-compliance to these instructions and recommendations.

Always ensure that an electric actuator is completely isolated before removing the lid to carry out any internal inspection or work. When connected electrically the RIFT® 400 is capable of carrying lethal voltages.

RIFT® 400 Electric Actuators operate with the use of live electricity. Only qualified electricians or people instructed in accordance with electrical engineering, and familiar with local electrical Installation requirements and health and safety directives should be involved in the connection of these actuators.

MOUNTING TO A VALVE

RIFT® 400 Electric Actuators have mounting options that conform to ISO:5211 which enables them, where applicable, to be direct mounted to similarly compliant valves, thus eliminating the cost and additional height of a traditional box section (or similar) 'mounting kit'. ISO:5211 introduced a system to ensure the actuator drive is concentric and in vertical alignment with the stem or shaft of the valve to be driven, and the actuator is solidly mounted to the valve. All aspects of valve and actuator mounting are critical to the correct perf ormance of the assembled valve and actuator.

The RIFT® 400 has a base flange, giving an ISO:5211 mounting option as follows;

ISO:5211		Large Flange: F10
Dimensions 'F' | PCD | No of holes | Metric female thread size? Max thread depth Bespoke design available, contact the factory for details and maximum dimensions.		F14: 140 | 4 | M16 | 14
		F12: 125 | 4 | M12 | 14
		F10: 102 | 4 | M10 | 14
Female square drive (mm) Standard | Option		22mm
Maximum depth of female drive output Bespoke design available, contact the factory for details and maximum dimensions.		17mm drive, max 19mm deep
		22mmdrive,max 24mm deep

The female metric threads in the base flanges tapped to the specifications of the fitting.

Ensure that the height of the stem or shaft to be driven, from the valve's ISO:5211 platform to the top of the stem or shaft, does not exceed the maximum depth of the female drive output to be used as this will push the actuator's internal components upwards which will cause irreparable damage.

Care must be taken when selecting the bolts to secure the valve to the actuator flange to ensure that the bolts do not reach the solid bottom of the threaded fixing before the bolt is tight against the valve flange.

Ensure that the valve is in the same position as the actuator when assembling the valve to the actuator; otherwise the opposite position in the valve to the signal sent to the actuator will result. To assist with this, the closed symbol is molded into the actuator lid to ensure that the closed position/orientation is known, and the local visual indicator LEDs will indicate the current position of the actuator.

Where the valve is supplied with a lock washer on the stem nut (the nut that compresses either the Belville washers, or the stem packing), ensure this lock washer is still fitted when assembling the valve to the actuator, and use washers if necessary to ensure that the lock washer cannot slide up when assembled and thus become ineffective. This lock washer prevents the stem nut slackening off during operation.

CALIBRATION

This function will allow the customisation and orientation of the actuator mounting onto the desired Valve.

It is recommended that this process is carried out (if possible) before the valve is installed onto the pipeline and id feasible carried out in the closed position. The RIFT® 400 will allow the calibration to be carried out in either the CLOSED or the OPEN positions.

- A warning that the Actuator will have to be put into "Local" control mode and external control signals will be ignored until the Auto/Man option is de-selected, the LED at 8 O'clock will flash Red in Local (Manual) Mode and be extinguished in Remote (Auto) Mode.

Open. "Angle in Degrees"

- allows the manual angle to be inputted as an angle e.g. 95°, 86° or other desired angle.

Closed. "Angle in Degrees"

- allows the manual angle to be inputted as an angle e.g. 05° -06° or other desired angle.
- These allow you to manually set up the desired Open/Closed when setting up the Valve (it is recommended to only to adjust one value at a time, "Writing to Flash" after adjusting)
- Set from current angle will set the current Actuator position as the angle for the Closed position and adjust it as so.

PROCEDURE TO USE CALIBRATION MODE TO MOUNT TO A, ISO 5211 FLANGE MOUNT

(a) Move the actuator to the closed position.

(b) Mount the RIFT® 400 actuator onto the valve (using the open/close pads in the manual position to align the ISO mounting positions.

(c) Secure the actuator onto the valve

CALIBRATION MODE WITH THE ANDROID RIFT APP

This feature will allow the OPEN/CLOSED positions for the RIFT® 400 to be calibrated to the required positions on the Valve.

The requested position for either Open or Closed can be Adjusted with the +/- buttons or by manually entering the required Angle manually. When the desired position for either Open or Closed is achieved the option to "SET OPEN/CLOSED HERE" should be selected and finally "Write to Flash" to commit those changes to the Firmware.

A prompt will ask, when completed adjustment, if you wish to maintain the last set working angle (e.g. 90°) if YES is selected the opposite angle will be adjusted from the new set position, if NO is selected the working angle will be assumed to be the difference between Open and Closed.

Please refer to the "Software User Guide for RIFT V10 Android" for full details for connection and configuration for the RIFT® 400 Actuator and the Latest Version of the Android Application Software.

CONFIGURING AS A PART-TURN ELECTRIC ACTUATOR SOLENOID

The RIFT® 400 can be configured either as a part-turn electric actuator or as a direct acting solenoid. The selection of actuator or solenoid is made when the factory default settings are programmed into the RIFT® 400 at the RIFT Actuators factory or authorized distribution center. When configured as an electric actuator, a three wire supply system with a switchable live/+v must be connected as, in this configuration, the RIFT® 400 will not reverse if only 2 wires are connected. The RIFT® 400 could operate with failsafe as the instruction to reverse on loss of power, however caution must be observed as the primary position will need to be the non-failsafe position for the battery to receive the majority of the operational period time to maintain the charge to the battery.

When connected using a 2 wire system, the RIFT® 400 can be configured as a standard normally closed solenoid so external power applied across the two pins opens the actuator and de-energizing closes it. The opposite occurs for normally open applications.

Function	Power open, power close, stays put on external power failure
Working Angle	Either 90° / 180° or Multi-Turn (user configurable as standard)
LED Array	Standard sequences available to show 2 or 3 way flow as per order
Maximum Torque	Up to 400 Nm
Over-torque Trip	Set at maximum torque +10%
Working Time	As per specifications on page 11
Output Orientation	In-line/ square, or at 45° (user configurable as standard)
Thermostatic Heater	Active when external power applied (see note below)
Basic Data Logging	Active (Full Movements, individual operations, Battery Voltage & internal temperature)

Dramatically different to solenoids, the RIFT® 400 introduces end of travel confirmation, local controls and torque protection and as an extra cost option, speed control.

Note:
Thermostatic/Anti-condensation Heaters. These are only supplied from the external power supply, if this is removed or not available the heaters will not operate and the actuator would be vulnerable to condensation.

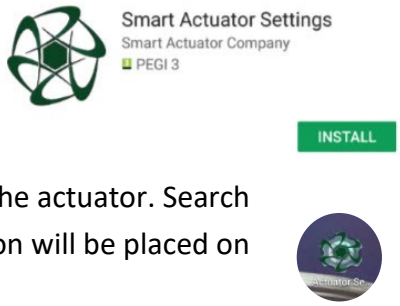
CONFIGURING AS A MULTI-TURN ACTUATOR

The RIFT® 400 can be configured either as a part-turn electric actuator or as a multi turn actuator. The selection multi-turn is made through the Features options, upon purchase of the appropriate paid for function through the Features Portal this will be updated onto the Android RIFT App when App is opened and connected to the internet.

CONFIGURING AS A MULTI-TURN ACTUATOR (Continued)

The Android Device will need to be able to connect to the Internet to retrieve the requested feature information.
The RIFT Actuators factory or authorized distribution centre is authorised to purchase these features. Once Multi-Turn is enabled the span can be adjusted beyond the default of <360° up to the required unlimited upper value, e.g. 70 complete turns (360° x 70) = a span in degrees of 25,200
When configured as a multi turn electric actuator, a three wire supply system with a switchable live/+v must be connected as, in this configuration, the RIFT® 400 will not reverse if only 2 wires are connected.

CONFIGURATION AND CONNECTION WITH ANDROID



A suitable Android Device (Tablet or Mobile) will be required to configure and set-up the RIFT® 400 Electric Actuator. Internet access to download the RIFT App will be needed to install the App and update the features for the actuator. Search the Google Play Store for the RIFT Actuators App. Install the App and the Icon will be placed on the front screen of the device.

PAIRING RIFT WITH ANDROID

Select Settings, Bluetooth, identify under “Available Devices” (e.g. SACO4 070317 1177) select the Actuator you wish to pair with. Enter the default pairing code “1234” the actuator should be displayed under the Paired Devices list.

RUNNING THE ANDROID APP

Open the App, this will take you to the Log-In page. You will need to enter your registered User Name (usually the registered email address) and the Password. You will not be able to proceed and interact with the actuator, if you are not registered. To register and create an account you need to click on the register button, complete the registration form. Or contact sales@riftactuators.com or directly on +44 (0) 1684 565709 during normal working hours.

On completion of logging into the App, You will be taken to the “Connect to Actuator” page this will display the unconnected and connected devices. Select the desired Smart Actuator. This will give access to the Control, Settings, Calibration and Features for this unit.

UPDATING RIFT FEATURES WITH ANDROID

When the Smart Act app is open and connected to the internet it will automatically sync all enabled features. When you connect your Android Device to the RIFT® 400 Actuator, the Features are updated automatically. You do not need Internet connection to complete this transfer, however you will need to establish a Bluetooth connection with the RIFT® 400 for this transfer to complete. Please note requirements for Bluetooth capabilities and restrictions.

USER CONFIGURABLE SETTINGS THROUGH BLUETOOTH ON ANDROID

A suitable Android Device (Tablet or Mobile) will be required to configure and set-up the RIFT® 400 Electric Actuator running Android 7.0 or greater, RIFT Actuators advise using the latest release or supported versions of Android. (Download the RIFT Legacy app from the Google play store if using a device prior to Android 7.0)

The RIFT® 400 direct acting actuator has a local control unit as standard to allow the actuator's accessibility to be controlled locally by Bluetooth Controlled User Interface "RIFT App" (Available from the Google Play Store). The following parameters or settings are user configurable when the actuator is connected onto its Android Device through the latest version of the RIFT Application. Internet access to download the RIFT App will be needed to install the App and update the features for the actuator.

The Android Device will have to be paired with the RIFT® 400 for the Application software to operate with the RIFT® 400 . Once paired and within the Bluetooth devices range the software will detect the RIFT® 400 devices and enable the user the option to connect to devices that have been paired with if within the Bluetooth range. It is recommended to pair and connect through the Android devices Bluetooth Setting option.

USER CONFIGURABLE SETTINGS BASIC SETTING.

- Firmware Version - Displays the version of the firmware flashed onto the RIFT® 400
- App Version—Displays the version of the App you are running.
- Valve Orientation - Set the valve orientation of the valve stem 45° (diamond) or 0° square.
- Number of full cycles - information on the total that the actuator has completed since firmware
- Number of starts - information on the total number of part operations that the actuator has completed.
- Reverse acting - allows the actuator to open Clockwise and close Counter Clockwise
- Indication mode - allows the user the option to select the valve flow type required (2 way, L port or T port)
- Torque profile - user settings to match the actuator to the type of valve that it is being used on (small to large ball and butterfly) custom settings option should only be used with after consulting the technical department of RIFT Actuators. As this will affect the performance of the RIFT® 400 actuator, as this will give access to PID control.
- Start in manual mode - should only be set if the user requires the Actuator to Start after re-storing external Power Supply in either manual mode or as previously set.
- Backlash - This setting is to remove any loose/play in the mounting of the Valve to the Actuator. It will apply this value to the open and the closed positions.
- Sleep when not powered - Default setting is for the actuator to enter sleep mode when external power is removed, this is to preserve the internal battery If the Actuator is required to remain awake when external power is removed this option can be selected but the battery life will be reduced.

- Buttons Enabled - This setting removes Local/Manual control via the Touch Pads. The operation of the Actuator this can be re-instated through the Android App when paired via Bluetooth to the RIFT® 400 and the electronics will need to be manually Re-Set on completion of this feature being enabled or disabled.

"Write To Flash" sets the custom settings into the Actuators Flash Memory. Notice of Writing to Flash will appear briefly at the bottom of the screen

"Reset Board Without Changing Settings" (Manual Re-Set) this is a soft re-set, Similar to pressing Ctrl/Alt/Del on a standard computer please note that the features & settings that have already been set, will not be lost)

"Restore All Default Values" Hard Factory Re-Set. This should be a "Last Resort Option" as all paid for Features & Settings will have to be re-applied and implemented

TORQUE LIMIT.

This function will allow the customisation of the maximum torque the RIFT® 400 actuator will be allowed to move to. The selection of this primarily is to offer protection to the valve the actuator is fitted to.
Torque Limit Back off allows the user to specify the angle that the actuator will back off if the Torque Limit is reached.
The RIFT® 400 Actuator will display an Orange  on the top indicating that the Torque Limit has been reached. This is a calculated function derived from Amperage draw from the Battery and the objective of the movement, this feature should not be used below an agreed threshold and should be discussed with the factory for further information.

FAIL SAFE.

This function will allow the RIFT® 400 Actuator to move the valve to a desired Safe position in the event of external power failure when in Remote Control.
Fail Open - On Power Loss the Actuator will move to the Open Position
Fail Closed - On Power Loss the Actuator will move to the Closed Position
Fail to Specific Angle - This allows the User to specify the desired angle to move to on Loss of External Power
Failsafe Angle - Enter the Angle between 0° and 360° (0° - 90° in normal operations)

(If the actuator is being used in Multi-Turn Mode and a larger angle than 360° can be set as the Failsafe Angle)

If the RIFT® 400 Actuator is in the Manual/Local Mode Failsafe will not action as Manual/Local Mode is a safety feature and can only be removed manually via the touch pad or Android App (button)

MODULATING.

This function will allow the RIFT® 400 Actuator to move the Valve to a desired proportional working position via an analogue input control signal either 4—20mA, 0—20mA or 10—10v.

Loss of Signal Mode -

On Loss of Signal the RIFT® 400 Actuator will move to either: Low Signal Position (Closed)
High Signal Position (Open)

Low Signal	RIFT® 400 Actuator will move to the Closed Position
Stay Put	RIFT® 400 Actuator will not move
High Signal	RIFT® 400 Actuator will move to the Open Position
Specific Angle	Manually enter the desired Angle in Degrees

Off	
0 to 10v	
4 to 20mA	Standard Analogue Process Signal input
0 to 20mA	
10v Switch	To be used in conjunction with a volt free switch

Input control to either pin 2 (0—10v) or pin 4 (0/4—20mA) on the Analogue five pin connection block will supply the control signal for the RIFT® 400 Actuator. Feedback Control to either pin 1 (0—10v) or pin 5 (0/4—20mA) on the Analogue five pin connection block will feed back the actual RIFT® 400 Actuator position in either (0—10v) or (0/4—20mA) respective to the control signal input.

Volt free switch connection is connected through pin 1 (0-10v) and pin 2 (0-10v) on the Analogue five pin connection block.

SPEED CONTROL

This function will allow the User to dictate Actuator speed to move the Valve to open and closed position. The maximum speed the actuator can operate 90° is relative to the size and torque of the valve the actuator is fitted to, see recommended speeds for torque listed Below. This is a Paid for Features and can be purchased through the Portal or an authorised distributor.

DEFAULT SPEEDS FOR TORQUE SETTINGS FOR 90°.

- UP TO 400 NM 25 SECONDS

The working time of the actuator will effect the charge capacity of the battery. The speed increase can also effect the accuracy of the 90° movement at the higher torques. Alteration of PID settings within the “Customer Settings” under Basic Settings will have to be implemented to adjust for this, these settings should only be altered by authorised trained personnel as incorrect adjustment will degrade the performance of the Actuator and can even damage the unit.

OFF GRID TIMER

This is a Factory only enabled function. This, when enabled will allow the User to programme the Actuator and allow operating settings to control the actuator, when separated from an external source of control.

Off Grid Settings.

- Time Until First Open - This allows time before the 1st operation from Resetting the PCB (See Manual Reset Page 10) and is entered in Hours, Minutes and Seconds or parts thereof.
- Open Time - This is the time that the actuator will remain open again set in Hours, Minutes and Seconds or parts thereof.
- Time between Cycles - Upon Shutting, this is the time between cycles set again in Hours, Minutes and Seconds or parts thereof.

The RIFT® 400 has the ability to work to autonomously with an external power source and no method of external control, this allows the actuator to operate in remote, inaccessible and hazardous settings with safety or on renewable energy platforms that are not easily assessable. We advise additional external battery storage is available to prolong operations on a predetermined cycle.

WIGGLE

This function will allow the RIFT® 400 Actuator to be programmed to operate and move over a designated pre-determined angle to prevent Valve Seizure due to infrequent operation.

Settings.

- Wiggle Angle - This allows the Angle of movement to be customised, preventing disruption in the normal operational position whilst the movement is carried out
- Time Between Wiggles - This allows the operator to choose the times that the actuator will move, set in Hours, Minutes and Seconds or parts thereof.

The RIFT® 400 has the ability to move the desired amount and frequency autonomously, this will not effect the normal general operation. The operational Control request of movement will always override the programmed RIFT® 400 Actuator “Wiggle” as programmed but will continue on the next programmed cycle.

MULTI-TURN FUNCTION

Set the actuator to operate multi-turn for some Linear Valves and multi-turn gearbox applications, the working span can be set from 90° to greater than 360° without upper limit.

CONTROL SYSTEM

This allows the actuator to be programmed to operate and move in a nonlinear movement when control from an external source requires the actuator to manage the flow with the position of the valve.

VALVE PROFILE

This function allows the actuator to be programmed to operate and move in a pattern similar to the design profile of specialised valves. The RIFT® 400 actuator matches the flow similar to the design of the valve

EXTRA OPTIONS IN DESIGN (or available with restrictions)

BESPOKE BRANDING

Housing cover colours, moulded logo etc.

The RIFT® 400 is designed to have external power permanently applied. The internal anti-condensation heater is only functional when external power is applied, without external power there is no protection against damage from condensation. Damage by condensation is therefore not covered by the warranty.

Note: (not all speeds are available at all motor power values) PID values will need to be adjusted. Consult your distributor or the RIFT manufacturers for advice.

ELECTRICAL CONNECTION - ACTUATOR FUNCTION

The RIFT® 400 has the capability to accept any externally applied voltage between the ranges 12-30vDC (12-26vAC) and 85 to 300v AC 1ph (50/60Hz), or DC. Supply voltages are segregated at the actuator's 10-pin terminal strip into a low voltage connection on Pins 8 – 10 (up to 30v maximum) and high voltage connections on Pins 1 – 4. (See page 15for wiring diagram)

Follow the wiring diagram appropriate to your functional requirement to ensure the correct connection of power and control signaling to the RIFT® 400 actuator.

DO NOT connect high voltage supply to the low voltage connection points on the terminal strip otherwise irreparable damage will result and damage so caused is not covered by the warranty.

The command signals set to the actuator to control its movement must NEVER allow ANY external power to be applied to the OPEN and CLOSE contacts AT THE SAME TIME otherwise irreparable damage will result and damage so caused is not covered by the warranty.

Ensure that each actuator has its own independent over-current protected switch or circuit breaker fitted as close as possible to the actuator and clearly marked that it is the isolator for that actuator.

Damage to the actuator resulting from excessive power being drawn through the actuator from inter-connected devices, such as a pump for example, is not covered by the warranty.

You should not rely on the internal earth terminal as the only protective earth connection and should ensure that the actuator has appropriate externally connected grounding protection.

Use cabling with the correct gauge and insulation to conform with the relevant local standards and codes, and use appropriate conduit or cable glands and ensure that they are fitted in accordance with the manufacturers' instructions to prevent water ingress via the cable glands. Damage from water ingress via the cable glands is not covered by the warranty.

ELECTRICAL CONNECTION - RECOMMENDED SEQUENCE

The RIFT® 400 has 2 power sources, external power connected via the 10 position terminal strip, and internal power provided by the 4 cell lithium ion battery pack. We recommend that the external connection be made first, ensuring compliance with local electrical codes and correct tightness of the cable gland around the cable to prevent ingress of water or moisture via the cable gland, followed by plugging in the internal battery.

The RIFT® 400 has 2 states: sleep, or awake. When shipped from the UK factory, the internal battery is fully charged and may not be connected. The actuator does not function if the battery is not connected, and plugging in the battery 'wakes' the actuator from its 'sleep' (or storage) mode. It is easier therefore to make the external connection first.

- Fit the correct cable glands/ conduit to the threaded cable glands (see later section on recommended connectors). Note that either M20 or 1/2" NPT are available; ensure you specify the correct threads for your requirement at order stage.
- For on-off or failsafe, we recommend either a single multicore cable (on 10 pin connector supplied) is used via the left entry and the right entry connected with 5 core cable (onto the 5 pin connection block) fitted for the command signals.
- If the end of travel confirmation relays are not being used, then a single 5 core cable (on 10 pin connector supplied) on the left entry and a plugged right entry is the preferred method.

Note that there are no cable grips, so ensure that the cable glands or connectors are tight around the cable to not only ensure water tightness, but to prevent the cables being pulled out of the terminal strip.

Make the external electrical connections in accordance with the wiring diagram on the following page, paying attention to the warnings at the top of this page.

Connect the 10-way connector on to the circuit board

Plug the internal battery into the connector socket on the underside of the circuit board

Replace the cover and fully and evenly tighten all 6 cover cap screws (M4)

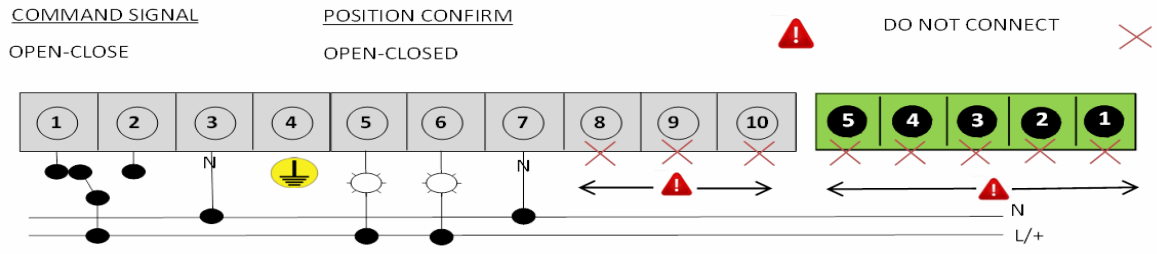
The RIFT® 400 is ready for 'switching on'

Warning: When connecting Live High Voltage via the 10 way Molex connector to the PCB the terminal pins on the top of the Board will be **LIVE** only remove the Actuator Lid to connect to the PCB if correct electrical isolations have been applied.

?

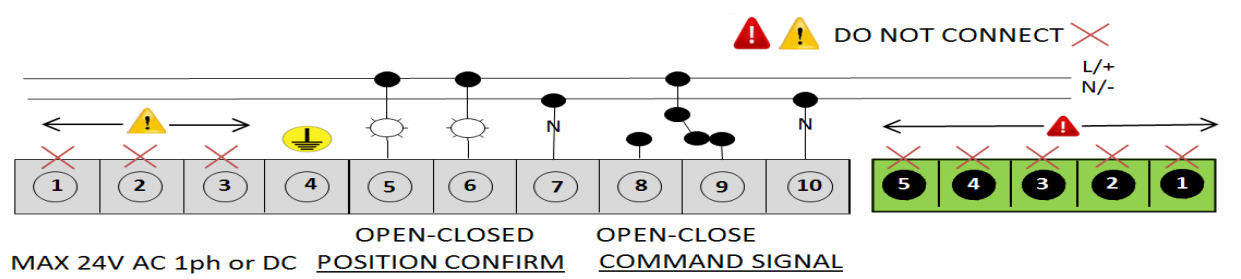
HIGH VOLTAGE EXTERNAL POWER SUPPLY CONNECTION

WIRING DIAGRAM - ON OFF FUNCTION FOR 85 -300V AC 1ph EXTERNAL POWER SUPPLY

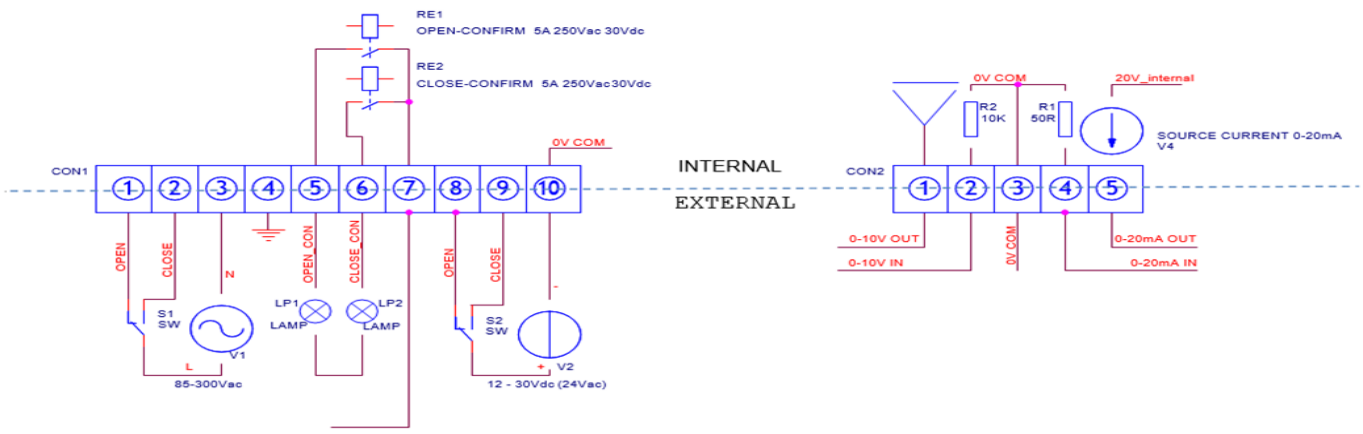


LOW VOLTAGE EXTERNAL POWER SUPPLY CONNECTION

WIRING DIAGRAM - ON OFF FUNCTION FOR 24V AC /1ph OR 12-30V DC EXTERNAL POWER SUPPLY



10-way Molex Plug Connector			
Pin No	Connection Input / Output	Pin No	Connection Input / Output
1	90 – 300v AC Power Open Control	6	Relay Out (Closed Feedback Position)
2	90 – 300v AC Power Closed Control	7	Relay Out (Neutral Connection)
3	90 – 300v AC Neutral Connection	8	0 – 90v AC/DC Power Open Control
4	90 – 300v AC (PE) Protective Earth	9	0 – 90v AC/DC Power Closed Control
5	Relay Out (Open Feedback Position)	10	0 – 90v AC/DC Neutral Connection
5-way Fixed Connection			
1	0 – 10v Analogue control (Out)	2	0 – 10v Analogue control (In)
3	Common connection for Analogue	4	20mA Analogue control (In)
5	20mA Analogue control (Out)		



LOCAL CONTROLS

The RIFT® 400 actuator has three physical external touch pads on the PCB and one internal reset button. The primary method of manual control due to the Sub-Sea enclosure will be through the Android device running the RIFT App. The features these provide Local Control, when used in con- junction with the 8 highly visible centre LED array are;

- Emergency hand operation to open or close the actuator.
- Switch between local or remote control, isolate the RIFT® 400
  This prevents the actuator from responding to Remote OPEN/CLOSE Commands and ANALOGUE Signal Control
- When mounting the RIFT® 400 actuator either, or make minor setting adjustments.

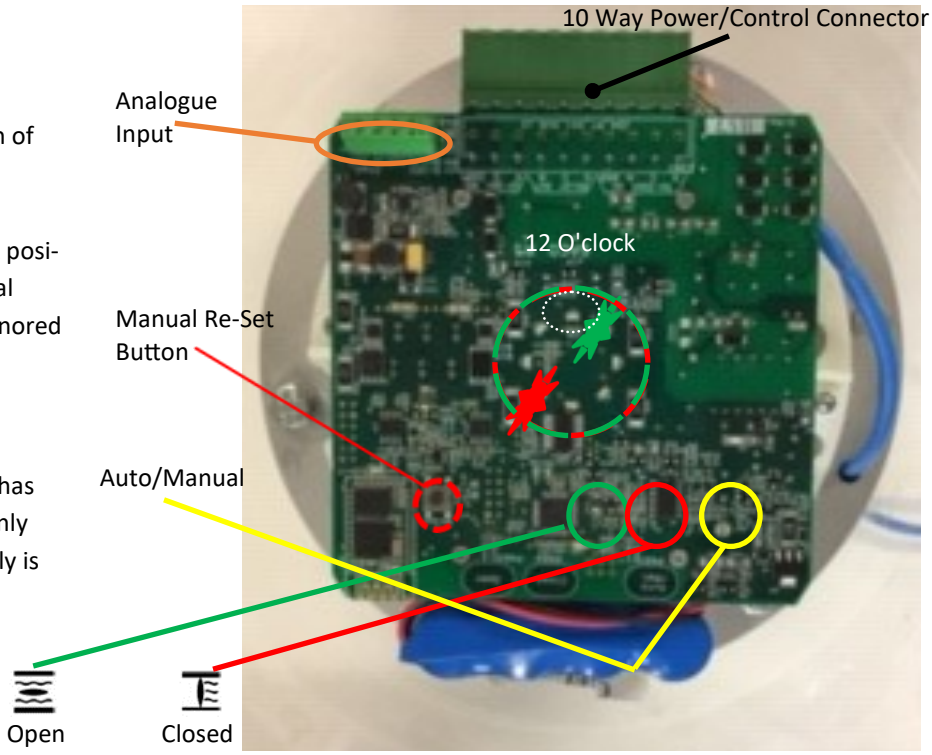
(Soft reset of the electronics, (similar to the Ctrl/Alt/Del) under Basic Settings option on the Android App only “Reset Board Without Changing Settings” this will re-set the board and an audible tune should be heard. The physical method is to access the PCB and press the re-set button.

RIFT® 400 PCB

8 x Bi-Colour LED's (Red & Green)
Circular orientation displaying direction of rotation and open/closed position.

Manual "Flashing Red" at the 8 O'clock position indicating the Actuator is in Manual Mode, external control signal will be ignored whilst in this mode.

Bluetooth Connected "Flashing Green"
This displays when the Android device has been paired and connected. This can only happen when the external power supply is live.



Touch Pad & Android App	STANDARD/DEFAULT TOUCH PAD FUNCTION	How to use
AUTO/MAN	Used to set the actuator to Local/ Remote control	Touch & Hold (4 Seconds) to activate
OPEN	Sends the actuator in a counter-clockwise rotation to open the actuator.	Touch & Hold
CLOSE	Sends the actuator in a clockwise rotation to close the actuator.	Menu DOWN
OPEN/CLOSE	Move the Actuator to the fully opposite position (Fully OPEN/Fully CLOSED)	Double Tap OPEN/CLOSE Touch Pads or the OPEN/CLOSE
Physical Re-Set	Access the PCB	Press to Re-Set
Software Re-Set	User Interface under Basic Settings	Click to Re-Set

SWITCHING RIFT® 400 'ON' (POWERING UP)

Before the RIFT® 400 can be operated, it must be taken out of sleep/ storage mode and made functional. To achieve this:

- Follow the electrical connection and battery connection sequence on page 16
- Press the Auto/Man Touch Pad or through the RIFT App. RIFT® 400 will illuminate & Flash the LED (Red) and display the position of the Actuator with 2 LED's. The RIFT® 400 is 'awake'

Displaying in the open position

Displaying in the closed position 

The RIFT® 400 is now ready to either start functioning as an ON-OFF reversible electric actuator. It is helpful in an emergency to be able to move the RIFT® 400 actuator independent of the remote control signal. This is commonly achieved with the use of an external mechanically hand wheel, the RIFT® 400 can be operated manually on the touch pads or with the RIFT Android App.

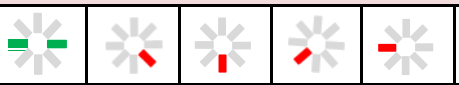
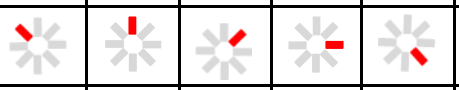
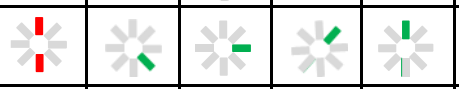
SWITCHING RIFT® 400 'ON' (CONTINUED)

This is achieved on the RIFT® 400 when external power is available and a remote command signal is being received (Auto), the actuator will respect the remote command signal being applied and if not already in the commanded position, and will move to it. If the actuator has been put into local control (Manual – RED Flashing LED illuminated at the 8 O'clock position) the local commands override the remote command signal and the actuator will move to that selected position whilst the Open/Close Pads are pressed. The actuator will not accept remote command signals until the actuator is put back into the remote command mode (Auto – RED FLASHING LED at the 8 O'clock position extinguished) When the actuator is released from local control (Manual) the actuator will revert back to the last or selected remote command position or Powered Position if no command given.
When mains power is unavailable, an internal trickle charged Li-Ion battery, supplied with the actuator, provides internal power to allow use of the Touch Pads on the PCB to open or close the actuator relative to the Pad being pressed. On releasing the Pad, the actuator will stay put, on resumption of external power the actuator will remain in local manual control and not move to the remote command position until the Auto/Manual Touch Pad on the PCB is pressed to release the actuator from this overriding control position returning the actuator to normal remote control selected position.

If it is ***essential*** that the actuator moves to a pre-determined position upon external power failure, ***you must*** select and configure the RIFT® 400 actuator for '**FAILSAFE**' functionality.

Auto/Manual Touch Pad on the PCB or via the Android App. selected (RED Flashing LED at the 8 O'clock position) for EMERGENCY HAND OPERATION is as follows;

If the actuator is OPEN with an open signal applied, this will have no effect, but pressing the CLOSE Pad it will start the actuator to rotate in a Clockwise (CW) direction and the RED LEDs will rotate in the direction of movement, and when the CLOSE Pad is released, the actuator will stop in its current position and two LED's will be displayed to show the approximate position of the actuator. Press the OPEN Pad and the actuator will move in a Counter Clockwise (CCW) direction and the LEDs will display Green. If the actuator is CLOSED with a Close signal applied, this will have no effect, but pressing the OPEN Pad will start the actuator to rotate in a CCW direction and the GREEN LEDs will rotate in the direction of movement, and when the OPEN Pad is released, the actuator will stop in its current position and two LED's will be displayed to show the approximate position of the actuator. Press the Close Pad and the actuator will move in a CW direction and the LEDs will display Red.

Start position	Command signal applied	LED Status	
OPEN	CLOSE 		Rotates CW until arrives at the Closed position or movement is stopped
			 Closed Position.
CLOSED	OPEN 		Rotates CCW until arrives at the Open position or movement is stopped
			 Open Position.

MANUALLY RE-SETTING THE ACTUATOR ON FAILURE TO OPERATE

If the actuator is powered and fails to respond to either an open or closed command the electronics can be soft re-set (similar to a computer via Ctrl/Alt/Del. You will either need to access the PCB or via the Android App. The Manual Re-Set Button (See Page 16) is located next to the Bluetooth module and close to the Open Touch Capacity Pad The electronics will re-set and an audible tune will sound. Please note any features that have been set or purchased will not be lost. This is could be an over torque protection situation, the electronics might have stopped working to self-protect.

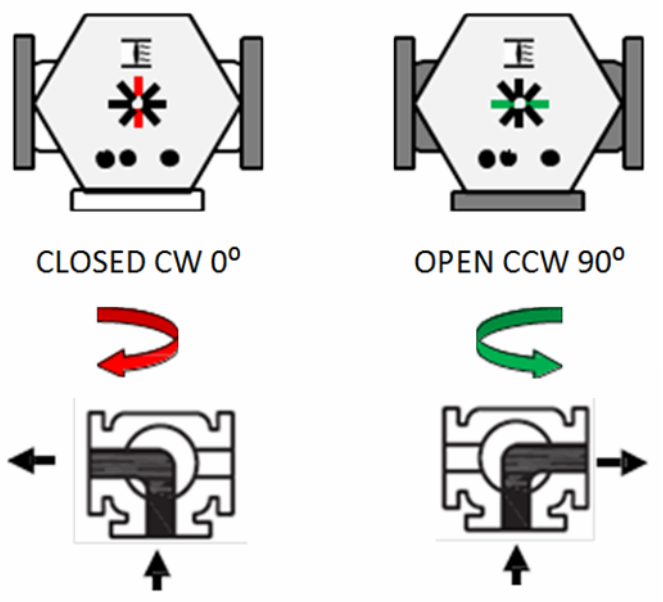
OVER-TORQUE INDICATION

The RIFT® 400 has the ability to protect the gears, motors, electronics and battery from exceeding the maximum safety torque of the actuator. This feature is not only to protect the actuator but also the valve is fitted onto, within its operational torque bands. If the maximum torque is exceeded through either blockage, or trying to exceed the operational design the LED's on the Lid and on the Android App, if Bluetooth connected, will indicate a cross pattern of flashing Orange LED's.

To resolve this, either select remotely the reverse direction allowing the blockage to clear the valve, or via local control, by selecting manual mode RED Flashing LED at the 8 O'clock position) move the actuator in the reverse direction or if unsure of direction of movement, when over torque occurred. Select the open direction first then close, allowing the blockage time to clear. The RIFT® 400 when reverted back to remote control will automatically move to the last remote selected position.

3 WAY BALL VALVES - DEFAULT FLOW PATTERNS

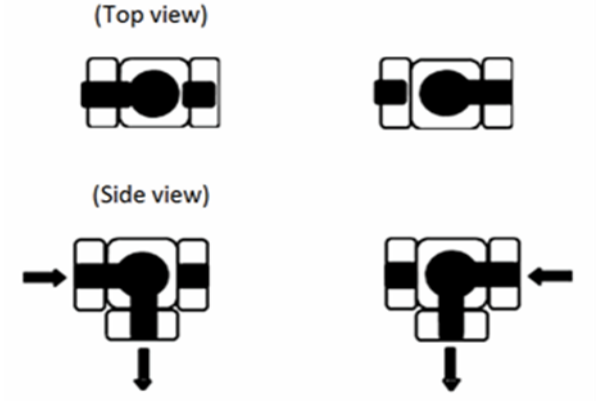
(Based on actuator and valve orientation as shown)



Side entry, 90° operation - Default flow pattern

L Port 3 way valves

LED Indication



Bottom entry, 180° operation - Default flow pattern

L Port 3 way valves

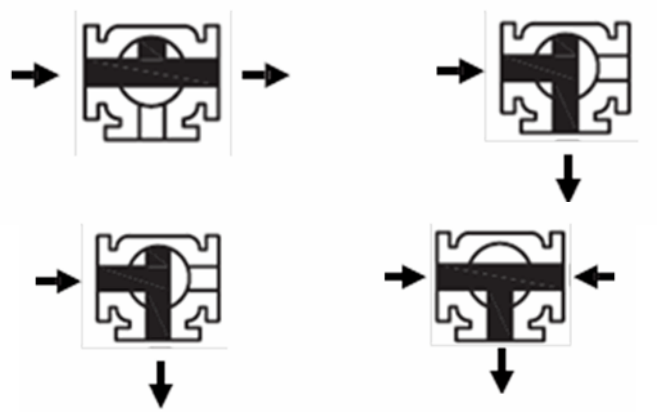
LED Indication

3 WAY BALL VALVES - DEFAULT FLOW PATTERNS (CONTINUED)

Side entry, 90° operation - Default flow pattern

T Port 3 way valves - Diverting

LED Indication



Side entry, 90° operation - Default flow pattern

T Port 3 way valves - Mixing

LED Indication

BLUETOOTH

Settings can only be accessed by via the Bluetooth User Interface on a Android based device;

- Install RIFT® 400 Android Application from the Googly Play Store.
- On the Android device, pair with the RIFT® 400 , ensure that Bluetooth is on. Add device Identified by the unique model number on the front label; enter pairing code “1234” when prompted.
- Connect through the app or with device settings
- Run the program from the RIFT icon.
- Log on. Only authorised registered users will be able to access and control their purchased actuators
- Select ‘Connect to Actuator’ pair with it if not paired already, this will move the paired Actuator over to the “Connected List”
- To amend parameters, click either Basic or desired feature as appropriate.
- Click into the parameter box of a setting you wish to amend, type a value or select from a dropdown, and click ‘Write To Flash’. The new setting is written to the RIFT® 100-400Nm flash memory and is available for use immediately. You can test the changes where applicable by selecting using the relevant buttons on the screen of your Bluetooth device (e.g. OPEN) and clicking, or physically touching the Pad on the RIFT® 400 . Please note that some parameter changes are chargeable and you must purchase features from the Portal to amend such parameters.
- Basic data is available on the Settings screen of the User Interface, including the number of full cycles the RIFT® 400 has achieved (open, reach desired working angle, close), and the number of times the motor has started for modulating applications where the end of travel is rarely reached).

When updating flash memory following a parameter change, take care to only click ‘Write to Flash’, the new settings are written to flash and a rotating, any Bluetooth operations must be done within the re-strictions and limitations of Bluetooth.

BATTERY FAILSAFE FUNCTION (BFS)

This Bluetooth configured option uses an internal trickle charged industrial Li-Ion battery as an alternate power source and independent to any external power supply, to set the actuator to a pre-determined position should the external power fail the FAILSAFE Feature must be activated.

These pre-determined positions are:

1) Close on external power failure (Normally Closed or NC)
2) Open on external power failure (Normally Open or NO)
3) Set fail to specific angle on external power failure (option to enter specific angle is only made available when this option is selected)

METHOD OF OPERATION:

Whilst external power is available the actuator responds to open and close command signals whilst the internal Battery Voltage remains above 12.2v, this is to protect the recharge capability of the internal 16.4v lithium ion battery. Should the external power fail, and failsafe is activated and the internal batteries set the actuator to the pre-designated position, if not already in that position. When the power is restored before the completion of the failsafe operation the RIFT® 400 will restore back to the operation position prior to power loss. For Failsafe and Manual/Local there is no lower voltage limit for the Battery.

MODULATING (PROPORTIONAL CONTROL) FUNCTION

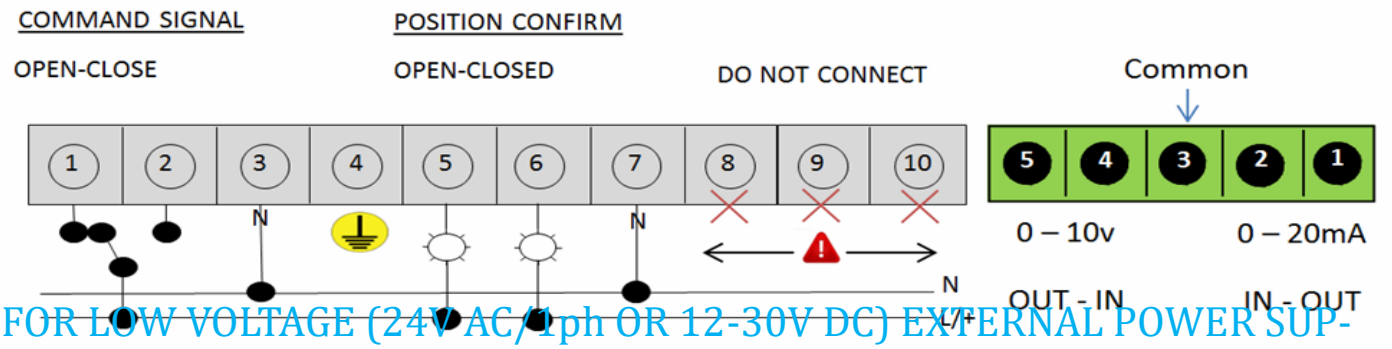
(Electronic Positioning System EPS)
The RIFT® 400 can be Bluetooth configured to select modulating control (see page 9 for using Bluetooth with the RIFT® 400). For modulating control, check the 'Modulation' Feature in the User 'Features Settings' section. The RIFT® 400 must also be correctly connected for modulation as per the wiring diagram below.

Warning When updating flash memory following a parameter change, take care to only click 'Write to Flash'

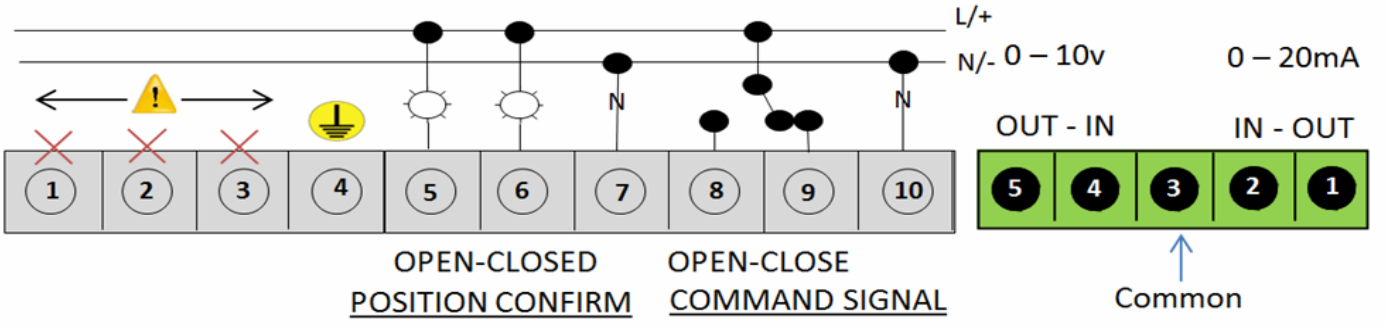
"Restore Defaults" this will restore the RIFT® 400 back to Factory Default Values. All paid for features and set-up values will be lost and the codes will have to be re-applied for from Smart Actuator factory or authorised distribution centre.

WIRING FOR MODULATING (PROPORTIONAL CONTROL) FUNCTIONALITY

FOR HIGH VOLTAGE (85 -300V AC 1PH) EXTERNAL POWER SUPPLY



FOR LOW VOLTAGE (24V AC/1ph OR 12-30V DC) EXTERNAL POWER SUPPLY



MODULATION CONNECTION FOR VOLT FREE SWITCH MODE

When connecting to a volt free switch (float switch for example) that requires the actuated valve to close on the switch circuit connection made, and open when the switch connection is broken, it can be configured through the modulation feature when activated and simple 2 core wiring connection from the volt free switch connected back to the Analogue input connec- 1 tions (0- 2 10v Out) & (0-10v In) on the 5 pin Analogue Input Connection.

WIRING FOR MODULATING "PROPORTIONAL CONTROL" FUNCTIONALITY (CONTINUED)

In modulating mode, the RIFT® 400 proportional controller (positioner) enables the actuator to automatically position a valve in proportion to an analogue current or voltage control signal. A signal derived from the actuator's non-contacting 10bit position sensor is automatically compared with a signal proportional to the input position. If a difference exists an open or close command to cancel the difference/error is generated by the EPS. The valve's position is therefore automatically adjusted in proportion to the analogue signal.

The external power supplied through the 10-way Molex connector is used as external power supply for the battery, Bluetooth and the anti-condensation heaters only and will not control the movement of the Valve & Actuator when Analogue Signal Control is selected, this is primarily used as a charging circuit.

Unnecessary frequent movement instigated by a constantly fluctuating input signal is dampened by averaging formulae within the EPS programme to prevent the motors running continuously.

Input signal options: 0-10v DC, 0-20mA, 4-20mA - Output signal options: 0-10v DC, 0-20 mA, 4-20 mA

EFFECT OF LOSS OF CONTROL SIGNAL FOR MODULATION: FAILSAFE MODULATING FUNCTION (EPS) ELECTRONIC POSITIONING SYSTEM

Configuration options	Position at low signal	Position on loss of control signal	Position at high signal	Position on loss of control signal
Standard acting (default)	CLOSED	CLOSED	OPEN	CLOSED
Reverse acting (option)	OPEN	CLOSED	CLOSED	OPEN

Including Battery Failsafe System (EPS+BFS)

In standard modulating mode the RIFT® 400 will stay put on external power failure. The RIFT® 400 can however be configured for failsafe modulating functionality, where it will be driven to a pre-determined position should external power be lost. This is achieved by combining the modulating and battery failsafe systems, selected both 'Failsafe' and 'Analog Control' in the Bluetooth. Interface. Effect of loss of external power with failsafe enabled:

Configuration options	Position at low signal	Position on loss of POWER	Position at high signal	Position on loss of POWER
Standard acting (default)	CLOSED		OPEN	
Reverse acting (option)	OPEN		CLOSED	

UNDER DEVELOPMENT

The RIFT® 400 will be capable of being configured to be used with the more commonly used field bus communication systems. A separate PCB is installed to provide the functionality and connectivity.
Options:

a) Profibus
b) Modbus
c) Fieldbus
d) Device Net
e) Pack scan
f) Profi Net
g) Replacement of the 2 x M20 Cable Glands entry points on the base, with 2 x external DIN EN 175301-803, allowing the actuator to be externally connected and the Lid on the actuator to be factory sealed.
h) Boot Loader for any Software Updates and/or New Features

DEFINITIONS & ABBREVIATION

Definitions & Abbre-viation	Explanation
AC	Alternating Current
DC	Direct Current
PCD	Pitch Circle Diameter
LCM	Local Control Mode
PID	Proportional Integral Derivate
CW	Clockwise
CCW	Counter Clockwise
LED	Light Emitting Diode
BFS	Battery Failsafe
Nm	Newton Meters
PCB	Printed Circuit Board
PSU	Power Supply Unit
EPS	Electronic Positioning System
mA	Milliamps
RIFT	Reduced Induction Field Torque
RPM	Revolutions Per Minute
SACO	Smart Actuator Company (A RIFT Technology Company)
RIFT	Patent and Licence holding company
NO	Normally Open
NC	Normally Closed
SMT	Surface Mount Technology
VAC	Volts, Alternating Current
VDC	Volts, Direct Current
SW	Switch
NPT	National Pipe Thread

DOCUMENT REVISION TABLEDOCUMENT REVISION TABLE

Date	Name	Revision Details
25/10/2019	Brown	1st revision for RIFT® 400 Sub-Sea and Android App
06/05/2020	Fabio Musio	Change all SmartAct to RIFT