Satchwell

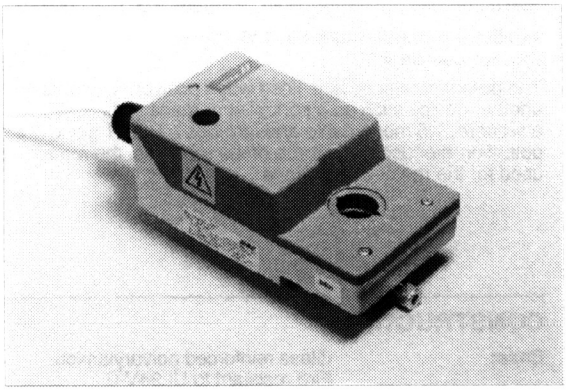
EMC APPROVED PRODUCT CE

**DS 3.17**

January 1997

# ROTARY ACTUATORS

## Types ARM, ARX, ARE



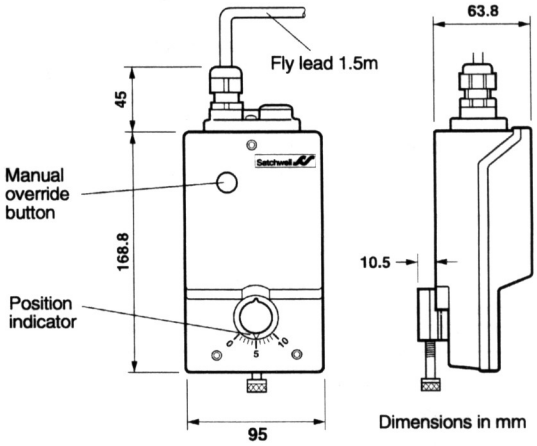
The Satchwell 'AR' range of reversing actuators have a rotary output for coupling to air dampers or rotary valves requiring a rotary drive through approximately 95°. Models are available for mains Voltage, 24Vac and 0 to 10Vdc. All can be used for either modulating or ON/OFF control depending on the control signal supplied to the actuator.

The 'AR' actuators are supplied with the bracket and stroke limiter required for direct mounting to a damper box.

The following linkage kits and accessories are available:

**Linkage Kits**
– Traditional connection to damper boxes - 866-2-407
– MBF 3 port flanged valves 65 to 100mm - 826-2-701
– MB 3 port screwed valves ½" to 2" - 826-2-702
– VV 2 port screwed butterfly valves 2" to 4" - 826-2-703 (the VV valve is obsolete)

**Accessories**
– Auxiliary switch kit (2 switches, SPCO) - 831-2-208
– Auxiliary potentiometer kit (135 Ohms not for use on ARE) - 831-2-301




## FEATURES

- **Compact size**
- **Hollow actuator drive output shaft accommodates any length of damper shaft without the need to cut it**
- **Simple to install, most dampers do not require universal joints or rods**
- **Accommodates shaft diameters from 10 to 20mm and square shafts from 10 to 16mm square**
- **Direct damper connection kit supplied as standard**
- **Single socket screw fitting to damper shaft**
- **Stroke limiter supplied with the actuator**
- **1.5 metre fly lead supplied for electrical connections (terminals and/or conduit entry may be used if required)**
- **Complies with all relevant EC directives for EMC and electrical safety**
- **Double insulated, no earth required**
- **Case sealed to IP 54 to prevent ingress of dust and moisture**
- **Tamper resistant settings and wiring**
- **Actuators can be connected in parallel**
- **Comprehensive range of accessories**

## SPECIFICATIONS

| TYPE | ARM 2601 | ARX 2201 | ARE 2301 |
|---|---|---|---|
| Specification Number | 473–2–601 | 473–2–201 | 473–2–301 |
| Power Supply | 230Vac ±10% 50/60 Hz | 24Vac ±10%, 50/60 Hz supplied by a transformer conforming to EN 60742 | 24Vac ±10%, 50/60 Hz supplied by a transformer conforming to EN 60742 |
| Consumption | 36.5 VA | 2.5 VA | 5 VA |
| Input Control Signal (for modulation) | Pulsed 230Vac | Pulsed 24Vac | 0 to 10Vdc |

| | |
|---|---|
| **Action:** | Reversing - modulating |
| **Stroke Time 0 to 15Nm:** | 90 to 150 Seconds |
| **Starting and Running Torque:** | 15Nm |
| **Holding Torque:** | 5Nm |
| **Angular Stroke:** | 95° |
| **End of Stroke Limits:** | By stalling against mechanical stops. A stroke limiter is provided for dampers requiring less than 90° of stroke. |
| **Maximum Ambient Temperature:** | Operating: –20 to +50°C<br>Storage and transit: –40 to +70°C |
| **Direct Connection to Damper Boxes:** | Anti rotation bracket and stroke limiter included for direct mounting to damper boxes. The stroke limiter is included to limit the stroke so that the actuator does not either fully open or close. The use of the stroke limiter is optional. |

**Auxiliary switch kit (2 switches, SPCO):** **831-2-208**

Pack of two Voltage free changeover switches rated at 250Vac, 5A. Fully adjustable one from position 0 to 5 and the other from 5 to 10. Supplied with a six core, 1.5 metre cable. Includes PG 11 gland nut.

**Auxiliary potentiometer kit, 135 Ohms (not for use on ARE):** **831-2-301**

The potentiometer pack is fitted when positional feedback is required to another device such as a controller or management system. Supplied with a six core, 1.5 metre cable and includes a PG 11 gland nut. The potentiometer uses only three of the six cores, the remaining three are used for the motor connections.

**Linkage Kit**

**MBF 3 port flanged valves 65 to 100mm:** **826-2-701**

Used to fit the AR Mark 2 actuator to the MBF rotary shoe valve which includes a manual override lever.

**MB 3 port Screwed valves ½" to 2":** **826-2-702**

Used to fit the AR Mark 2 actuator to the MB rotary shoe valve.

**VV 2 port Screwed butterfly valves 2" to 4":** **826-2-703**

Used to fit the AR Mark 2 actuator to the VV butterfly valve. The VV valve is obsolete.

**Traditional connection to damper boxes:** **866-2-407**

Bracket, output shaft, crank arm and universal couplings for traditional damper mounting. An 8mm diameter connection rod is also required, not supplied.

## CONSTRUCTION

**Case:** Glass reinforced polyarylamide. Fire resistant to UL94V-0.

**Protection Class:** IP 54

**Wiring Entries:** Two PG 11 entries, one entry is used by the motor fly lead and the other is plugged and can be used for the switch kit fly lead.

**Terminals:** 1.5 metre fly lead routed through a PG 11 gland nut. The actuator terminals can be used if required and will accept 2 x 1.5mm$^2$ wires.

**Conduit Entries:** It is possible to convert the cable outlet to a PG 11 conduit fitting by removing the cable gland and or plug as required.

**Number of Cores:**

| | |
|---|---|
| ARX, ARM: | 3 cores |
| ARE: | 4 cores |
| Auxiliary Switch Kit: | 6 cores |
| Auxiliary Potentiometer Kit: | 6* cores |

*The Potentiometer only uses 3 cores, the spare 3 cores are used for the motor connections. No Earth is required as the actuators are double insulated.

**Mounting Attitude:** Any position, but not below the valve or damper.

**Position Indicator:** Marked 0 to 10 representing 0 to 100% of the actuator stroke.

**Manual Operation:** A push button disengages the gear train so that the controlled device may be manually positioned.

**Always take care, when manually positioning a valve or damper, to avoid trapping fingers etc.**

**Shaft Connection:** Accommodates shaft diameters from 10 to 20mm and square shafts from 10 to 16mm square. Secured by a single M8 socket head screw. Minimum Shaft length of 20mm.

## INSTALLATION

### LOCATION

Select a location that is reasonably clean and free from damp and condensation.

**DO NOT SWITCH ON POWER UNTIL THE COMMISSIONING STEPS HAVE BEEN COMPLETED.**

**ALWAYS TAKE CARE WHEN MANUALLY POSITIONING A VALVE OR DAMPER TO AVOID TRAPPING FINGERS ETC.**

1. Check the location has adequate access for fitting and wiring. If you need to open the actuator e.g. setting an ARE, fitting auxiliary switches and/or the auxiliary potentiometer, then allow enough access to remove the lid and work on the actuator.
2. Ambient temperature limits –20° to +50°C.
3. The actuator may be mounted in any attitude as long as it is not beneath the valve or damper as this presents a risk of condensation dripping down the shaft and onto the actuator. There must be **NO** angle between the actuator and the damper/valve shaft.
4. For mounting on MBF valves and traditional damper fixing please refer to DS 5.81.

### FITTING STROKE LIMITER SUPPLIED (OPTIONAL)

The stroke limiter packed with this linkage kit is optional and is used for the following reasons:

i. To limit either the opening or closing of a damper, e.g. minimum fresh air.

ii. To limit travel when a damper runs through less than 95° and stalling against the damper end stop could cause damage to the damper. This may for instance be required on lightweight dampers.

The limiter is adjustable in 10° steps.

1. Unscrew the M8 socket screw from the actuator (fig.1).
2. Move the actuator to the position that it is to stop at and drop the stroke limiter on to the output shaft of the actuator so that the straight edge butts up against the flat of the actuator. This will prevent the shaft turning any further and thus limit the stroke.
3. Push the limiter down firmly matching up the shaft and limiter serration's. Now fit the plastic retaining clip into the actuator output shaft slot.
4. Refit the M8 socket screw.

### DIRECT CONNECTION TO DAMPER BOX USING KIT SUPPLIED

1. Follow the instructions given for location.
2. The actuator will fit damper shafts of 10 to 20mm diameter and 10 to 16mm square with either the flat or corners of the damper shaft in line with the damper blades. The minimum damper shaft length is 20mm, there is no maximum length.

3. **ALWAYS TAKE CARE, WHEN MANUALLY POSITIONING A VALVE OR DAMPER, TO AVOID TRAPPING FINGERS ETC.**

   According to the direction of damper rotation, manually close the damper. Disengage the actuator drive by depressing the manual operation button and use the M8 socket head screw to manually move the actuator to the closed position (0 or 10 on the actuator scale depending on damper rotation direction).

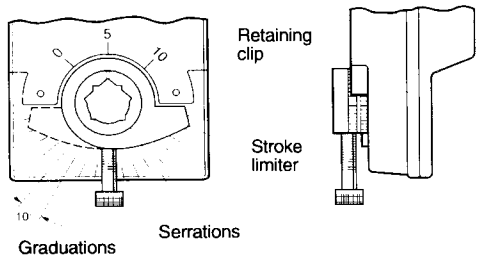



Fig.1

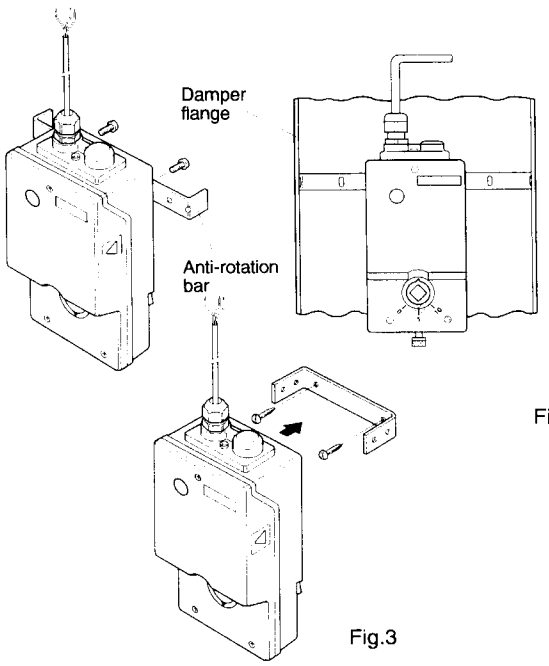



Fig.2

Fig.3