

1. SCOPE

This document details the application of SOP 429 (Applicable to British Thomas Houston (BTH) MF36 RMUs) issued by the Energy Networks Association.

2. ISSUE RECORD

This is a Reference document. The current version is held on the EN Document Library.

It is your responsibility to ensure you work to the current version.

Issue Date	Issue No.	Author	Amendment Details
July 2022	1	Patrick Dolan	Original Issue

3. ISSUE AUTHORITY

Author	Owner	Issue Authority
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4. REVIEW

This is a Reference document which has a 5 year retention period after which a reminder will be issued to review and extend retention or archive.

5. DISTRIBUTION

This document is not part of a Manual maintained by Document Control and does not have a maintained distribution list. It is published on the SP Energy Networks website.

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7. SOP DETAILS

EQUIPMENT TYPE	BTH MF36
ORIGINATING COMPANY	SPEN
DATE	04/07/2022
NUMBER INSTALLED IN ENERGY NETWORKS NORTH	0
NUMBER INSTALLED IN ENERGY NETWORKS SOUTH	80
REASON	<p>An issue was uncovered on a BTH MF36 Switch where the contacts did not close correctly upon operation. Upon investigation, the drive crank was found to have worked its way loose from the operating shaft and as a result prevented the switch contacts from fully closing.</p> <p>The incident caused heavy carbonisation of the oil and contacts which indicated a very high resistance connection between the switch contacts.</p> <p>Visual Inspection of other live units (possible in service without operation) showed that the drive crank had also loosened from the operating shaft and had the potential to cause the same hazard.</p>
STATUS IN INITIATING COMPANY	No Live operation of the RSW unless inspection completed to confirm that drive crank is correctly secured to the operating shaft. Inspection shall also be completed post operation.
SPEN APPLICATION	As above
ADDITIONAL INFORMATION	<p>Inspection of the drive crank is possible whilst the equipment is in service by looking at into the mechanism from underneath the equipment. Further details can be found in Appendix 1.</p> <p>All units were previously affected by SOP 131, the drive crank was painted on completion of SOP remedial works. If during inspection of these units, any units are found without painted drive cranks (typically yellow or red), the issue must be reported to control</p> <p>Any issues found to be reported to control. The procedure to re-secure the drive crank can be found in Appendix 2</p>
UPDATE	
REMEDIAL ACTION	The long-term effectiveness of procedures to re-secure the drive crank is under review. This SOP should be considered permanent unless this document is updated to confirm a repair procedure will provide an ensuring fix to the issue.

8. SOP HEADER

Field Name	Field Value	Field Size
Name (SOP) *	SOP429	6
The reason for the Operational Restriction *	SW failure to fully Close	30
Nature of the Operational Restriction *	Live op of RSW restricted	50
Comments *	No Live operation of the RSW unless inspection completed to confirm that drive crank is correctly secured to the operating shaft. Inspection to be repeated post-op	200
Restricted Access to Substation Flag *	Y <u>N</u>	1
SOP Impact Code * <i>(highlight or underline the appropriate code)</i>	0 Temporary/Impact under assessment <u>1 Very minor operational/network impact</u> 2 Moderate operational/network impact 3 Significant impact on system perf./measurable business costs 4 Inoperable without intervention 5 Inoperable – no cost effective solution/must be replaced	N/A
SOP component type * <i>(highlight or underline the appropriate code)</i>	01 Bushing only 02 Circuit Breaker 03 Fixed Portion only 04 Moving Portion only 05 Switch <u>06 RMU</u> 07 Transformer only 08 Tap Changer only 09 Transformer & Bushing 10 Transformer & Tap Changer	N/A
Search Criteria *	Manufacturer (*BTH* or *AEI* or "BRITISH THOMPSON HOUSTON* or *METRO VICKS*) and Type (*MF36*) Reference Appendix 3	N/A

* This denotes a Mandatory Field

9. APPENDIX 1 - DEFECT INSPECTION PROCEDURE

The following method should be used to inspect the RSWs and confirm the integrity of the mechanism prior to operation.

Place a torch under the RSW to be examined.

This should point up into the open cubicle where the switch mechanism is contained (as below).



The component to be inspected is at the top of the cubicle

The drive crank should be painted (yellow in this case).

If the drive crank is not painted, immediately report to control.



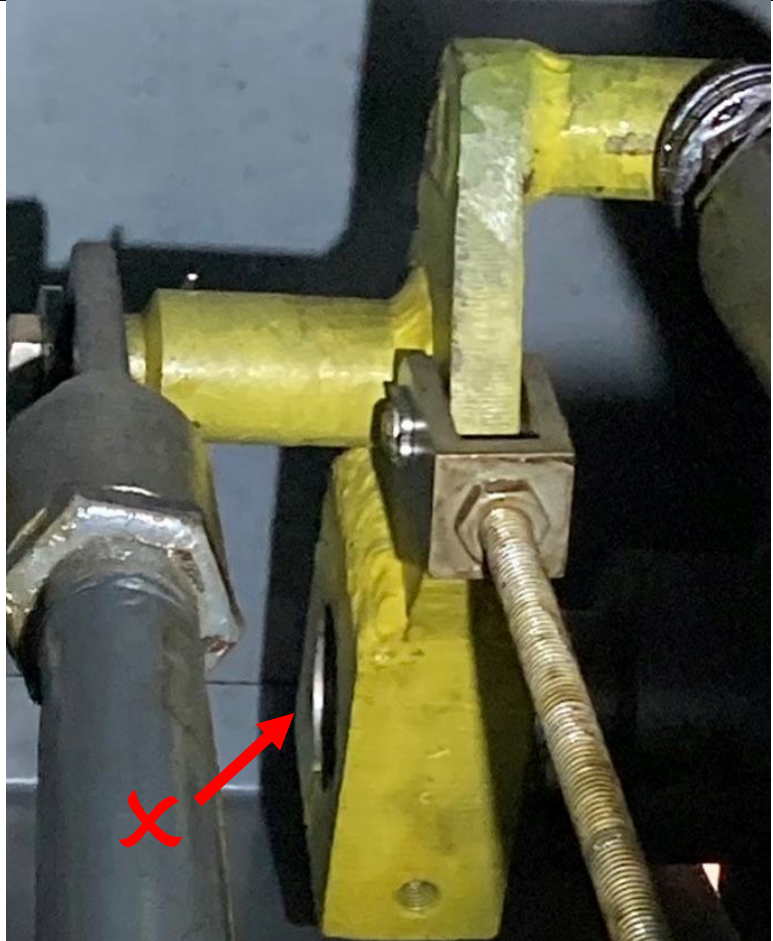
It is essential to focus in on the drive crank (typically yellow or red) to assess the units.

The photos below show examples of equipment that is acceptable to operate and equipment that is not acceptable to operate.

Equipment **not acceptable** to operate



See the hole where the **X**
operating shaft should fully enter
(flush to the end) / protrude
through the yellow/red drive
crank



Equipment acceptable to operate



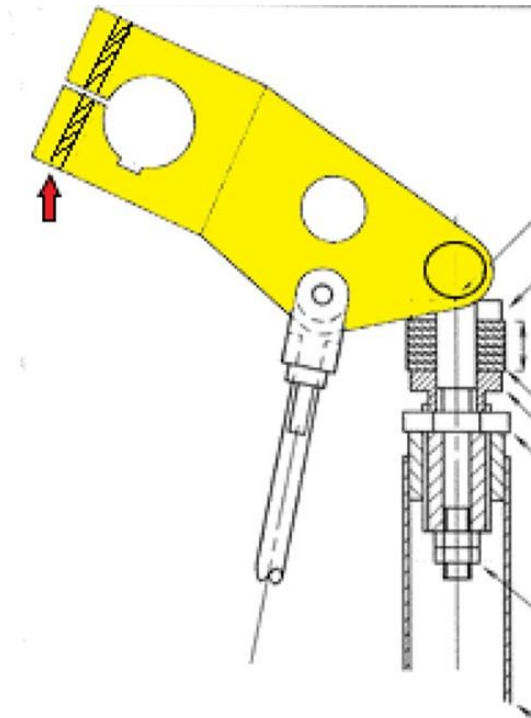
See where the operating shaft protrudes through the hole in the yellow drive crank



11. APPENDIX 2 - RE-ALIGNMENT PROCEDURE

If the drive crank is found to have moved in position under inspection, it is necessary to reposition it under permit for work conditions.

The drive crank component that needs to be secured is shaded yellow in the drawing below. In some regions this has been painted other colours. There is a threaded hole that runs through the drive crank as indicated by the red arrow. The drive crank is secured to the operating shaft using a bolt



Under the head of the bolt is spring washer. The arrangement below shows an example of where the drive crank has detached from the operating shaft.



Under permit for work conditions, with the top cover of the RMU removed, the associated assembly should be positioned so that the drive crank is lined up to the end of keyed portion on the bottom of the operating shaft (red arrow in picture below).

The metal surface of the operating shaft will be cleaner in the position the drive crank should be seated if it has moved in position.

See the area marked by the red box, with arrow showing where drive crank was initially located.



When the drive crank is seated in the correct position, it should be secured with the bolt and spring washer.

The switch should be then operated five times and then again inspected to confirm that the drive crank has not moved. If there is any movement, the drive crank must be repositioned and tightened in place and again operated five times to check and ensure that it is secure.

The switch electrical contacts should be inspected for thermal damage / carbonisation due to misalignment issues on previous operations and should have electrical continuity tests carried out in the closed position to ensure that there is adequate contact and that readings are consistent across all 3 phases. If any issues are found, maintenance shall be completed on the unit.

The permit can be cancelled when the drive crank is confirmed to be adequately secured and the switch contacts have been confirmed to have good electrical connections in the closed position.

12. APPENDIX 3 - LIST OF AFFECTED EQUIPMENT

ENID	Equipment	Description of functional location
10382201	700368028	MARSH BROWS-033
10382219	700368029	MARSH BROWS-033
10382205	700368030	FRESHFIELD-033
10382211	700368032	BURLINGTON AVENUE-033
10382210	700368033	PINFOLD LANE-033
10382185	700368034	AINSDALE-033
10382187	700368038	YORK ROAD -033
10382191	700368039	YORK ROAD -033
10382192	700368040	GRANTHAM CLOSE-033
10382199	700368041	GRANTHAM CLOSE-033
10382195	700368042	MARKET STREET-033
10382193	700368044	LORD STREET-033
10382204	700368045	LORD STREET-033
10382206	700368048	MARSHSIDE-033
10382202	700368052	MULLARDS BALMORAL DR-033
10382160	700368066	WEST KIRBY SOUTH-033
10382157	700368067	CALDY-033
10349301	700368070	BROMFIELD-033
10382148	700368073	GREASBY-033
10382149	700368074	GREASBY-033
10382158	700368077	SAUGHALL MASSIE-033
10382156	700368078	THINGWALL-033
10382161	700368079	CHAMPION PLUGS-033
10459900	700368080	CHAMPION PLUGS-033
10382123	700368083	CADBURY'S-033
10382125	700368084	CADBURY'S-033
10382162	700368085	GAYTON-033
10382142	700368087	WOODCHURCH-033
10382197	700368088	UPTON-033
10382159	700368089	HOPFIELD ROAD-033
10382163	700368091	MOBIL OIL WALLASEY-033
10382141	700368093	OXTON-033
10382134	700368094	GILBROOK DOCK-033
10382145	700368095	SEAVIEW ROAD-033
10382133	700368096	NEW BRIGHTON-033
10382132	700368100	EGREMONT-033
10382138	700368101	EGREMONT-033
10349285	700368106	LLAY-033
10382153	700368111	LOWER BEBINGTON-033
10382143	700368112	EGERTON-033
10382127	700368113	CAMMELL LAIRD SOUTH-033
10382164	700368114	CAMMELL LAIRD SOUTH-033
10382154	700368115	TRANMERE-033
10382128	700368116	CAMMELL LAIRD NORTH-033

ENID	Equipment	Description of functional location
10382126	700368119	BR SHORE ROAD-033
10382215	700368120	BR SHORE ROAD-033
10382152	700368127	SPITAL-033
10382166	700368128	NEW FERRY-033
10382129	700368129	SHELL TRANMERE-033
10349289	700368145	HOOTON MAIN-033
10382124	700368146	DIBBINSDALE-033
10382139	700368166	PLYMYARD-033
10382131	700368167	B X L BROMBOROUGH-033
10382136	700368170	OLDHAM PLACE-033
10382155	700368225	STONEYCROFT-033
10349281	700368231	GROSVENOR STREET-033
10349296	700368232	LINENHALL STREET-033
10349302	700368233	NORTHGATE TERRACE-033
10382194	700368246	WEST VALE-033
10382217	700368247	WEST VALE-033
10349295	700368251	UPTON HEATH-033
10382218	700368256	SOUTHdene-033
10382203	700368257	KIRKBY CENTRAL-033
10382207	700368258	KIRKBY CENTRAL-033
10382190	700368272	NORTHWOOD-033
10349298	700368273	GREAT BOUGHTON-033
10349297	700368274	PIPERS ASH-033
10382130	700368278	WOODEND AVENUE-033
10382150	700368281	HUNTS CROSS-033
10382200	700368302	DITTON-033
10382196	700368310	PITT STREET-033
10382214	700368311	LUGSDALE-033
10382209	700368322	HALTON ROAD-033
10382212	700368324	USAC-033
10382189	700368325	PILK SULLIVAN-033
10382188	700368326	PETER SPENCE-033
10382198	700368328	HORNSBRIDGE-033
10382216	700368329	HORNSBRIDGE-033
10382140	700470704	SINGLETON AVE 6-6KV-033
10382144	700470729	SINGLETON AVENUE 11KV-033