

## FLUSH CASEMENT WINDOW **TECHNICAL MANUAL**

#### INTRODUCTION

This manual contains information of a technical nature and consequently is only intended for use in the course of a business by persons who are skilled in the subject matter covered.

Although reasonable care has been taken in the preparation of this manual, the Epwin Group does not accept any liability for damage resulting (whether directly or indirectly) from the use of the information contained in this manual.

Accordingly this manual is supplied on the basis that the user accepts all risks associated with the use of the information contained within it.

As it is company policy to continually improve products, methods and materials, changes of specification may be made from time to time without prior notice.

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#### MINIMUM/MAXIMUM SIZES

#### SIZES

All sizes below are based on overall sash size.

All sizes	below	are	based	on	overall	sash	size
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WQ30 Sash								
Top Hung(TH) / Side Hung(SH)	Stay Size	Min Width (mm)	Max Width (mm)	Min Height (mm)	Max Height (mm)	Max Weight (Kg)		
ТН	8″	See espag sizes	1221	300	321	10		
ТН	10"	See espag sizes	1221	322	400	16		
ТН	12"	See espag sizes	1221	401	621	21		
ТН	16″	See espag sizes	1221	622	771	22		
ТН	20"	See espag sizes	1221	772	921	24		
ТН	24"	See espag sizes	1221	922	1221	50		
SH	12"	372	621	See espag sizes	1221	24		
SH	16"	622	721	See espag sizes	1321	26		

WQ32 Sash							
Top Hung(TH) / Side Hung(SH)	Stay Size	Min Width (mm)	Max Width (mm)	Min Height (mm)	Max Height (mm)	Max Weight (Kg)	
ТН	10″	See espag sizes	1221	350	400	16	
ТН	12″	See espag sizes	1221	401	621	21	
ТН	16″	See espag sizes	1221	622	771	22	
ТН	20″	See espag sizes	1221	772	921	24	
ТН	24″	See espag sizes	1221	922	1221	50	
SH	12"	372	621	See espag sizes	1221	24	
SH	16″	622	721	See espag sizes	1321	26	

Espagnolette	e Size	Min Width (TH)	Max Width (TH)	Min Height (SH)	Max Height (SH)
335	Size1	476	640	476	640
500	Size2	641	890	641	890
750	Size3	891	1140	891	1140
1000	Size4	1141	1221	1141	1274
1250	Size5	-	-	1275	1321



## **FIRE ESCAPE OPENING**

Any window provided for emergency egress purposes should have an unobstructed openable area that is at least 0.33m<sup>2</sup> in area and at least 450mm high and wide (the route may be at an angle rather than straight through). The openable area should not be more than 1100mm above the floor.

Locks and child resistant safety stays may be provided on escape windows.

As shown below, when using an egress stay supplied by Epwin, the min SASH WIDTH to achieve a 450mm clear opening is 555mm for a WQ30 flush sash and 570mm for a WQ32 fully flush sash. The height of the sash and height to top of frame cill must be proportioned such that the other criteria above are both achieved.

NOTE that the sizes shown below do not take account manufacturing tolerances for hardware or frames. Therefore, it would be prudent to allow for these when specifying sash sizes.



Dimensions in mm DO NOT SCALE

## **IXX VALUES CHART**

The site wind load should be calculated in accordance with BS EN 1991-1-4. Alternatively, the abbreviated method shown in Annex A of BS 6375-1 may be used, but this gives more conservative results.

The chart below shows the effective Ixx and Iyy values of the framing profiles calculated in accordance with BS EN 14024. The required Ixx of the profiles must be calculated and the correct profile (with an equal or greater Ixx) selected from the chart below.

Drawing	lyy (cm⁴)			Profile Span										
Drawing	$\leftrightarrow$		500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600
	3.26		5.45	6.60	7.79	8.95	10.08	11.14	12.13	13.04	13.86	14.62	15.30	15.92
	11.63		6.68	7.99	9.36	10.77	12.17	13.53	14.84	16.06	17.22	18.30	19.29	20.20
	19.42		7.29	8.88	10.56	12.29	14.01	15.70	17.33	18.87	20.32	21.68	22.95	24.10
æ.	7.15		5.83	7.06	8.34	9.62	10.88	12.10	13.24	14.30	15.29	16.21	17.04	17.80
E .	7.14		5.79	7.02	8.28	9.54	10.76	11.92	13.01	14.02	14.95	15.79	16.57	17.27
lt - Il	2.39	lxx (cm⁴) ≎	9.05	10.35	11.70	13.06	14.38	15.66	16.86	17.99	19.02	19.98	20.85	21.65
	16.92		9.42	10.77	12.21	13.72	15.25	16.77	18.25	19.68	21.04	22.33	23.54	24.68
	16.48		7.00	8.37	9.82	11.31	12.79	14.25	15.65	16.99	18.24	19.42	20.52	21.53
۲Ţ ۱	3.35		20.01	21.40	22.87	24.39	25.91	27.40	28.85	30.22	31.52	32.73	33.86	34.91
F J	1.77		4.19	5.23	6.25	7.22	8.11	8.93	9.66	10.31	10.89	11.41	11.86	12.26
<u>F</u>	6.52		5.43	6.76	8.15	9.54	10.89	12.19	13.41	14.55	15.61	16.58	17.47	18.27



## **DESIGN CRITERIA**

#### Design Criteria

The details on the following pages are based around the overlaps and clearances shown below.







![](_page_8_Figure_1.jpeg)

![](_page_8_Picture_3.jpeg)

![](_page_8_Picture_4.jpeg)

![](_page_9_Figure_1.jpeg)

stellar<sup>™</sup>

![](_page_10_Figure_1.jpeg)

![](_page_10_Picture_4.jpeg)

![](_page_11_Figure_1.jpeg)

![](_page_11_Figure_2.jpeg)

![](_page_11_Figure_3.jpeg)

![](_page_12_Figure_1.jpeg)

![](_page_12_Figure_2.jpeg)

![](_page_12_Picture_5.jpeg)

![](_page_13_Figure_1.jpeg)

![](_page_13_Figure_2.jpeg)

![](_page_14_Figure_1.jpeg)

![](_page_14_Figure_2.jpeg)

Dimensions in mm DO NOT SCALE

![](_page_14_Picture_5.jpeg)

![](_page_15_Figure_1.jpeg)

![](_page_15_Figure_2.jpeg)

![](_page_16_Figure_1.jpeg)

![](_page_16_Picture_2.jpeg)

![](_page_16_Picture_3.jpeg)

![](_page_16_Picture_4.jpeg)

![](_page_16_Picture_5.jpeg)

![](_page_16_Picture_6.jpeg)

![](_page_16_Picture_7.jpeg)

WQ56

WQ57

![](_page_16_Figure_10.jpeg)

![](_page_16_Figure_11.jpeg)

![](_page_16_Figure_12.jpeg)

![](_page_16_Picture_14.jpeg)

![](_page_17_Figure_1.jpeg)

![](_page_18_Figure_1.jpeg)

![](_page_18_Figure_2.jpeg)

![](_page_18_Picture_5.jpeg)

![](_page_19_Picture_1.jpeg)

![](_page_19_Figure_2.jpeg)

![](_page_19_Picture_3.jpeg)

![](_page_20_Figure_1.jpeg)

![](_page_20_Figure_2.jpeg)

stellar<sup>™</sup>

![](_page_21_Figure_1.jpeg)

stellar<sup>™</sup>

![](_page_22_Figure_1.jpeg)

![](_page_22_Figure_2.jpeg)

![](_page_22_Picture_5.jpeg)

#### **CUTTING CALCULATIONS**

All powder coated bar lengths have jigging marks at both ends. Allowance must be made for this in cutting calculations. Bars are either square cut or mitre cut at 45°.

TOLERANCES Cut length = +/- 0.5mm Cut Angle = +/- 0.5°

Below are the size allowances for all outerframes and transoms. Deductions are made from frame sizes and mullion/ transom centres to arrive at the inside frame rebate size (IFR). All sash, bead and glass sizes are related to the IFR size.

If not already fitted, gaskets/seals (WG02 & WG03) can be pre-fitted to profiles before cutting.

![](_page_23_Figure_5.jpeg)

SASH	Illustration	Deduction From IFR
WQ30	J.	6mm*
WQ32	₩Ţ	6mm*

\* On top hung sashes of 400mm high and smaller, reduce sash stiles by a further 1mm

stellar<sup>∗</sup>

# **CUTTING CALCULATIONS - REVERSE BUTT JOINT**

Where internal glazed fixed lights are required next to opening lights, a reverse butt joint is required in the frame and/or transom/mullion.

The illustration below shows a typical window to demonstrate where reverse butt joints occur.

![](_page_24_Figure_3.jpeg)

![](_page_24_Picture_6.jpeg)

#### **INSIDE GLAZED FRAME DRAINAGE**

- Where a fixed light occurs at a cill without a sub-cill, carry out face drainage preparation as shown below.
- On fixed lights up to 350mm wide, place one slot at the centre.
- On fixed lights over 350mm up to 900mm wide two slots as shown.
- On fixed lights over 900mm wide add one slot centrally.

![](_page_25_Picture_5.jpeg)

## T TRANSOM DRAINAGE

Where a sash occurs above another sash with a T transom, carry out face drainage preparation on the transom as shown below.

On sashes up to 350mm wide, place one slot at the centre.

On sashes over 350mm up to 900mm wide two slots as shown.

On sashes over 900mm wide add one slot centrally.

Where a side hung sash occurs omit slot in top face at hinge side.

![](_page_26_Picture_6.jpeg)

## Z TRANSOM DRAINAGE

Where a sash occurs above a fixed light, carry out drainage preparation on the Z transom as shown below.

On sashes up to 350mm wide, place one slot at the centre.

On sashes over 350mm up to 900mm wide two slots as shown.

On sashes 900mm wide add slot centrally.

Where a side hung sash occurs omit the slot in the top face at the hinge side.

![](_page_27_Figure_6.jpeg)

![](_page_27_Figure_7.jpeg)

![](_page_27_Picture_8.jpeg)

## FACE DRAINAGE FOR SASH IN FRAME

Where a sash occurs at a cill with no sub-cill, carry out face drainage preparation on the cill as shown below.

On sashes up to 350mm wide, place one slot at the centre.

On sashes over 350mm up to 900mm wide two slots as shown.

On sashes over 900mm wide add one slot centrally.

Where a side hung sash occurs omit the slot in the top face at the hinge side

![](_page_28_Figure_6.jpeg)

## **CONCEALED DRAINAGE FOR SASH IN FRAME**

Where a sash occurs on a sub-cill, carry out concealed drainage preparation on the cills as shown below.

On sashes up to 350mm wide, place one slot at the centre.

On sashes over 350mm up to 900mm wide two slots as shown.

On sashes 900mm wide add one slot centrally.

Where a side hung sash occurs omit slot in top face at hinge side.

![](_page_29_Figure_6.jpeg)

![](_page_29_Figure_7.jpeg)

ILLUSTRATION	DESCRIPTION	DIM A
	SLIM FRAME CORNER	96.0
	MEDIUM FRAME CORNER	114.0
	DEEP FRAME CORNER	132.0
	ALL FRAMES REVERSE BUTT JOINT SLIM Z MULLION	87.0
	ALL FRAMES REVERSE BUTT JOINT WIDE Z MULLION	96.0

ILLUSTRATION	DESCRIPTION	DIM A
	ALL FRAMES MULLION T JOINT SLIM T MULLION	87.0
	ALL FRAMES MULLION T JOINT WIDE T MULLION	96.0

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## SASH DRAINAGE

To be carried out on all sash bottom rails

On sashes up to 350 wide one hole centrally On sashes over 350 up to 900 wide two holes as shown On sashes over 900 wide add one hole centrally

![](_page_30_Figure_3.jpeg)

![](_page_30_Picture_6.jpeg)

#### FIXED TRANSOM DRAINAGE

Where a fixed light occurs above a fixed light, carry out drainage preparation as shown below on the T transom.

![](_page_31_Picture_2.jpeg)

25 x 5 SLOT ON UNDERSIDE -WHERE DISTANCE BETWEEN SLOTS EXCEEDS 1200MM ADD AN EXTRA PREP CENTRALLY

ILLUSTRATION	DESCRIPTION	DIM A
	SLIM FRAME CORNER	96.00
	MEDIUM FRAME CORNER	114.00
	DEEP FRAME CORNER	132.00
	ALL FRAMES REVERSE BUTT JOINT SLIM Z MULLION	87.00
	ALL FRAMES REVERSE BUTT JOINT WIDE Z MULLION	96.00

ILLUSTRATION	DESCRIPTION	DIM A
	ALL FRAMES MULLION T JOINT SLIM T MULLION	87.00
	ALL FRAMES MULLION T JOINT WIDE T MULLION	96.00

#### **OUTERFRAME CRIMPING**

Apply 2 part epoxy adhesive to all corner cleat pockets, apply sealant to all mating faces including gasket ends.

Crimp using corner crimper. Clean off the excess sealant from exposed faces immediately using a suitable cleaner. Apply additional bead of sealant to insides of glazing rebates to ensure a watertight joint.

NOTE the WQ01 frame can also be crimped onto WQ03 frame using WA01 cleats. Trim extended leg from WQ03 after crimping.

![](_page_32_Figure_4.jpeg)

![](_page_32_Picture_7.jpeg)

#### SASH CRIMPING

Apply 2 part epoxy adhesive to all corner cleat and chevron pockets. Apply sealant to all mating faces including gasket ends.

Crimp using corner crimper. Clean off excess sealant from exposed faces immediately using suitable cleaner. Apply additional bead of sealant to insides of glazing rebates to ensure a watertight joint.

![](_page_33_Figure_3.jpeg)

![](_page_33_Figure_4.jpeg)

## **RUN-UP BLOCK FITTING**

![](_page_34_Figure_1.jpeg)

![](_page_34_Picture_4.jpeg)

## T MULLION TO FRAME JOINT

Seal mullion plug into frame. Seal all mating faces and under heads of screws. Clean all excess sealant off exposed faces immediately using a suitable cleaner.

![](_page_35_Figure_2.jpeg)

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#### **Z MULLION TO SLIM T TRANSOM**

Seal WA23 mullion plug into place. Seal all mating faces and under screw heads. Clean off excess sealant immediately after assembly with a suitable cleaner

![](_page_36_Figure_2.jpeg)

Dimensions in mm DO NOT SCALE stellar<sup>™</sup>

#### SLIM T MULLION CRUCIFORM JOINT

Seal all mating faces and seal WA22 mullion plugs in place. Fit transom 1 using F7756045 screws passing through WA21 cruciform brackets. Fit transom 2 using F7690019 screws. Clean off excess sealant immediately using a suitable cleaner.

![](_page_37_Figure_2.jpeg)

#### SLIM Z MULLION REVERSE BUTT JOINT

Seal all mating faces and seal WA22 mullion plugs in place. Assemble outerframe using WA07 (or 08) brackets and F7650008 screws. Fit WA10 brackets to mullion using F7715013 screws. Fit mullion to frame using F7756038 (or F7756050) screws (apply lubricant to screw threads before fitting). Clean off excess sealant immediately using a suitable cleaner.

Use drill jigs WJ01 & WJ02

![](_page_38_Figure_3.jpeg)

Dimensions in mm DO NOT SCALE stellar<sup>™</sup>

## **REVERSE BUTT JOINT T MULLION**

Note: Where mullion meets outerframe, WA10 brackets are not required when mullion sleeves are used. In addition the mullion fixing screw on the rebate side must be increased in length to screw F7756064.

Seal all mating faces with suitable sealant. Slide mullion sleeves into mullion. Pull joint apart slightly and apply 2-part epoxy adhesive for 50mm either side of joint onto sleeves. Fit assembled mullion into frame and fully tighten outerframe to mullion fixing screws. Seal WA22 plugs into place. Drill into mullion sleeve as shown and fit WA12 brackets using F7756025 screws. Fit transom over brackets and fix with F7715013 screws. Clean off excess sealant immediately with suitable cleaner.

Use drill jig WJ02

![](_page_39_Figure_4.jpeg)

#### **REVERSE BUTT CRUCIFORM JOINT**

Note: Where mullion meets outerframe, WA10 brackets are not required when mullion sleeves are used. In addition the mullion fixing screw on the rebate side must be increased in length to screw F7756064.

Seal all mating faces with suitable sealant. Slide mullion sleeves into mullion. Pull joint apart slightly and apply 2-part epoxy adhesive for 50mm either side of joint onto sleeves. Fit assembled mullion into frame and fully tighten outerframe to mullion fixing screws. Seal WA22 plugs into place. Drill through mullion sleeve as shown and fit WA12 brackets using F7756050 screws into opposite transom. Fit transom over brackets and fix with F7715013 screws. Clean off excess sealant immediately with suitable cleaner.

Use drill jig WJ02

![](_page_40_Figure_4.jpeg)

## WIDE MULLION TO FRAME JOINT

Seal mullion plug into frame. Seal all mating faces and under head of screws. Clean all excess sealant off exposed faces immediately using a suitable cleaner.

![](_page_41_Figure_2.jpeg)

#### WIDE MULLION CRUCIFORM JOINT

Seal all mating faces and seal WA23 mullion plugs in place. Fit transom 1 using F7756045 screws passing through WA21 cruciform brackets. fit transom 2 using F7690013 screw. Clean off excess sealant immediately using a suitable cleaner.

![](_page_42_Figure_2.jpeg)

![](_page_42_Picture_5.jpeg)

#### WIDE Z MULLION TO WIDE T MULLION JOINT

Seal WA23 mullion plug into place. Seal all mating faces and under screw heads. Clean off excess sealant immediately after assembly with a suitable cleaner

![](_page_43_Figure_2.jpeg)

## **REVERSE BUTT JOINT WIDE Z MULLION**

Seal all mating faces and seal WA23 multion plugs in place. Assemble outerframe using WA07 (or 08) brackets and F7650008 screws. Fit WA11 brackets to multion using F7715013 screws. Fit multion to frame using F7756038 (or F7756050) screws (apply lubricant to screw threads before fitting). Clean off excess sealant immediately using a suitable cleaner.

Use drill jigs WJ01 & WJ02

![](_page_44_Figure_3.jpeg)

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## **REVERSE BUTT JOINT WIDE T MULLION**

Note: Where mullion meets outerframe, WA11 brackets are not required when mullion sleeves are used. In addition the mullion fixing screw on the rebate side must be increased in length to screw F7756064.

Seal all mating faces with suitable sealant. Slide mullion sleeves into mullion. Pull joint apart slightly and apply 2-part epoxy adhesive for 50mm either side of joint onto sleeves. Fit assembled mullion into frame and fully tighten outerframe to mullion fixing screws. Seal WA23 plugs into place. Drill into mullion sleeve as shown and fit WA13 brackets using F7756025 screws. Fit transom over brackets and fix with F7715013 screws. Clean off excess sealant immediately with suitable cleaner.

Use drill jig WJ02

![](_page_45_Figure_4.jpeg)

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## WIDE MULLION REVERSE BUTT CRUCIFORM JOINT

Note: Where mullion meets outerframe, WA11 brackets are not required when mullion sleeves are used. In addition the mullion fixing screw on the rebate side must be increased in length to screw F7756064.

Seal all mating faces with suitable sealant. Slide mullion sleeves into mullion. Pull joint apart slightly and apply 2-part epoxy adhesive for 50mm either side of joint onto sleeves. Fit assembled mullion into frame and fully tighten outerframe to mullion fixing screws. Seal WA23 plugs into place. Drill through mullion sleeve as shown and fit WA13 brackets using F7756050 screws into opposite transom. Fit transom over brackets and fix with F7715013 screws. Clean off excess sealant immediately with suitable cleaner.

Use drill jig WJ02

![](_page_46_Figure_4.jpeg)

#### FLUSH SASH ESPAGNOLETTE FITTING

Note that handle can only be fitted to flush sash AFTER glazing (See Glazing Page). Seal rear of handle to bead before fitting and clean off excess sealant immediately.

![](_page_47_Figure_2.jpeg)

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## FULLY FLUSH SASH ESPAGNOLETTE FITTING

Seal rear of handle to sash before fitting and clean off excess sealant immediately.

![](_page_48_Figure_2.jpeg)

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#### FRENCH CASEMENT SLAVE LOCK

The handle and espagnolette preparation in the bead and sash stile are are exactly the same as for the master lock on the previous two pages.

Fix handle first to locate espag.

Pre-drill through fixing holes 3.0 dia and fix with screws shown. Set shootbolt throw to 16mm in the locked position. Insert locking plate, then slide plastic sleeve over to lock in place.

![](_page_49_Figure_4.jpeg)

#### FRENCH CASEMENT MEETING STILE

![](_page_50_Figure_1.jpeg)

![](_page_50_Picture_4.jpeg)

#### ESPAGNOLETTE KEEP FITTING

After fitting espagnolette and hanging sash, partially close sash and mark centreline between each set of cams onto frame rebate. Align keep with centreline and drill 4.0 dia holes through holes in keep into frame. Fix keeps using F7766016 and F7766013 screws

![](_page_51_Figure_2.jpeg)

1

## **FRICTION STAY FITTING**

Drill first hole in frame and sash as shown below. Ensure that WG01 flipper seal is fitted to frame before fitting friction stay. Fit stay using first hole only. Ensure stay is located parallel to frame and drill additional 3.5 dia holes through slotted holes initially. Check operation of sash and adjust to give equal edge-cover all round. Final fix by drilling through round holes and fixing.

Use drill jigs WJ03 & WJ04

![](_page_52_Figure_3.jpeg)

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#### HINGE GUARD FITTING

On windows where enhanced security is required (e.g. PAS24, SBD or part Q), fit hinge guards as shown below adjacent to all friction stays.

Use drill jigs WJ03 & WJ04

![](_page_53_Figure_3.jpeg)

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#### **CAVITY LOCKING BLOCK FITTING**

Fit one cavity locking block at the centre of every hinge side which is 900mm or more. Fit a glazing packer adjacent to the block to prevent sash deflection (see glazing details).

Use drill jigs WJ03 & WJ04

![](_page_54_Figure_3.jpeg)

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#### GLAZING

#### **GLASS PACKING**

All Glazing should be in accordance BS6262 and all current codes of practice. Position the glazing packers as illustrated below ensuring that drainage isn't blocked. Note: 'Toe and Heel' the packers on side hung windows to ensure good operation of the window

When fitting cavity locking blocks, packers should be placed at this position to eliminate deflection of the frame. On enhanced security (PAS24) windows packers are also placed at the locking points and hinge security device positions to give extra security from forced entry. When openers are adjacent to fixed lights, packers are also put in the fixed light next to the locking points to prevent deflection of the transom or mullion.

![](_page_55_Figure_4.jpeg)

![](_page_55_Figure_5.jpeg)

![](_page_55_Figure_6.jpeg)

Position QM04 bridge packers as shown below. Position glazing packer on top of bridge. The nominal thickness of the packer is 2mm. The width of the packer should be (width of glazing + 4mm). e.g. for a 28mm unit, the packer should be 32mm wide (as shown below).

![](_page_55_Picture_8.jpeg)

![](_page_55_Picture_9.jpeg)

Knock beads in carefully using a wooden block or similar to protect the bead from damage.

Lubricate gasket with soapy water if necessary to aid insertion

![](_page_55_Picture_12.jpeg)

If not already fitted, fit WG03 retained gasket to the bead. On bottom beads only, fit WG10 seal cord as shown below. If necessary, lubricate with silicone spray to aid insertion.

![](_page_55_Picture_14.jpeg)

**NOTE:** All bead cut ends should be sealed with a suitable sealant and excess sealant should be cleaned off with a suitable cleaner after bead fitting.

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#### **TECHNICAL MANUAL ISSUE RECORD**

Issue 1 : 01/06/19

Initial release.

Issue 2 : 13/09/19

Page 42 - WA22 corrected to WA23. Part number added to manual.

![](_page_56_Picture_7.jpeg)